

OS/2[®]

M A G A Z I N E

Reviews

MQSeries

PhotoGraphics 1.0

ZipStream 1.20

From DOS to OS/2 Warp

The Dedicated
DOS/Windows
Session

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Plus

Learning with WarpGuide

OpenDoc meets VisualAge for Basic

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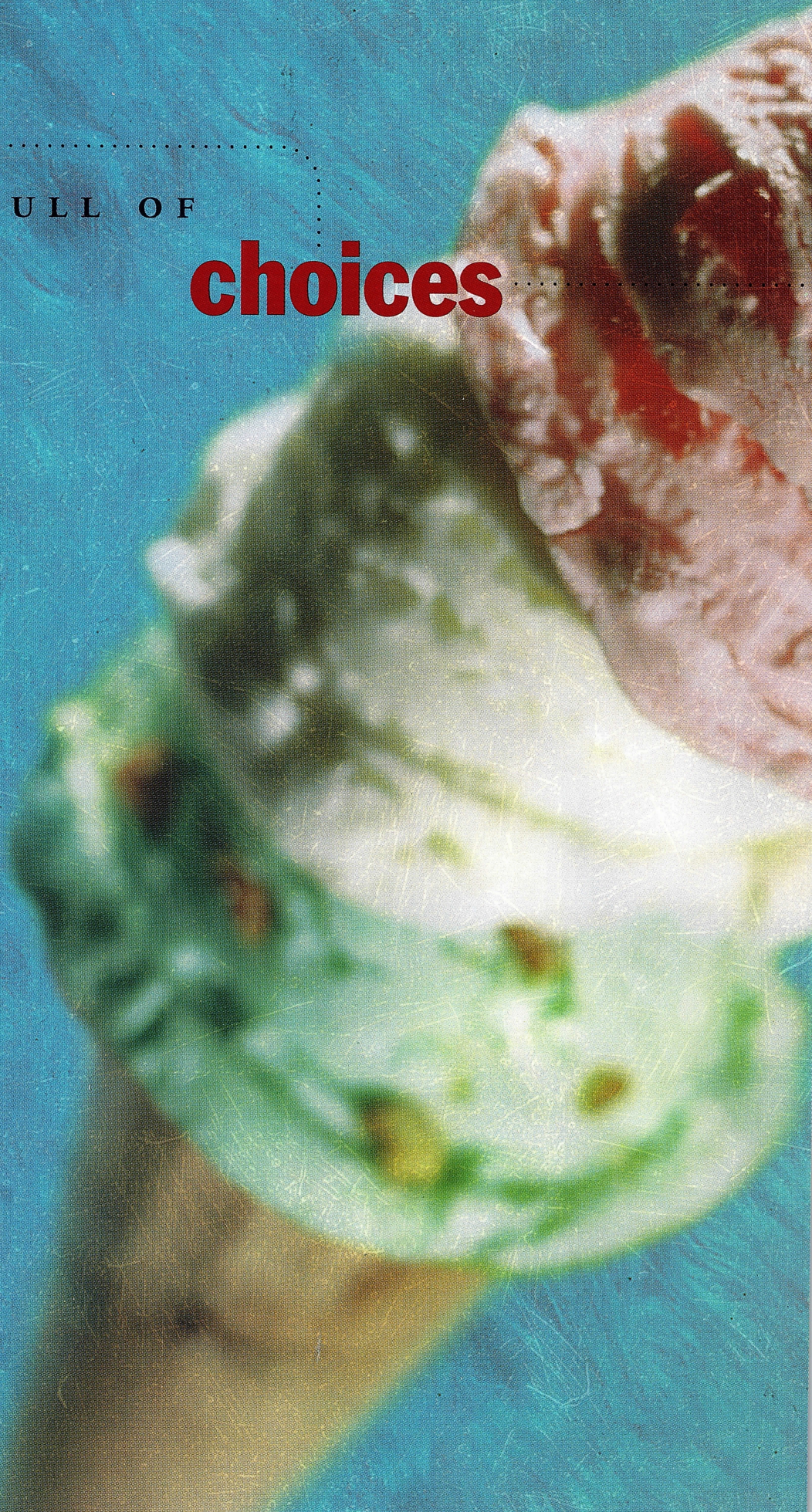


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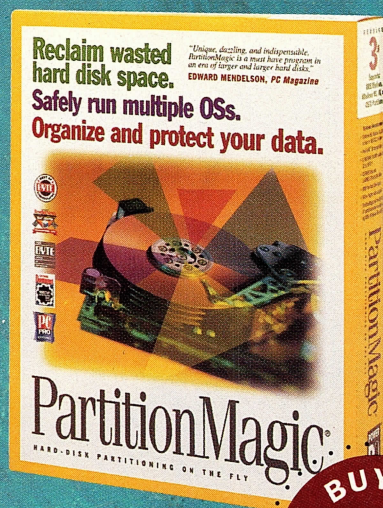
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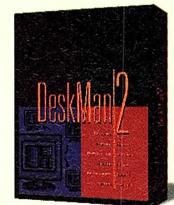
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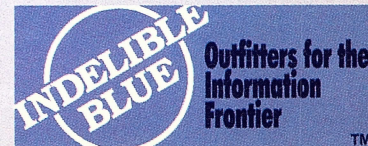
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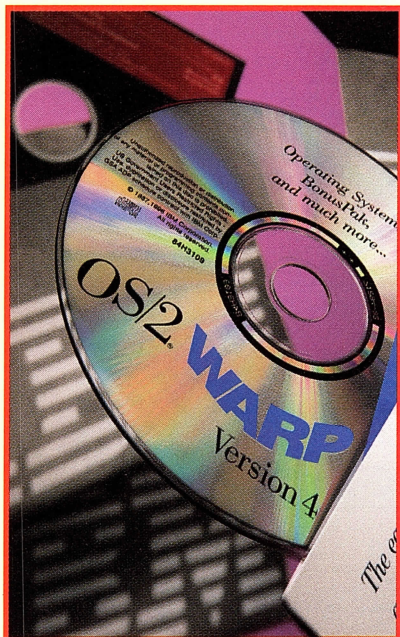
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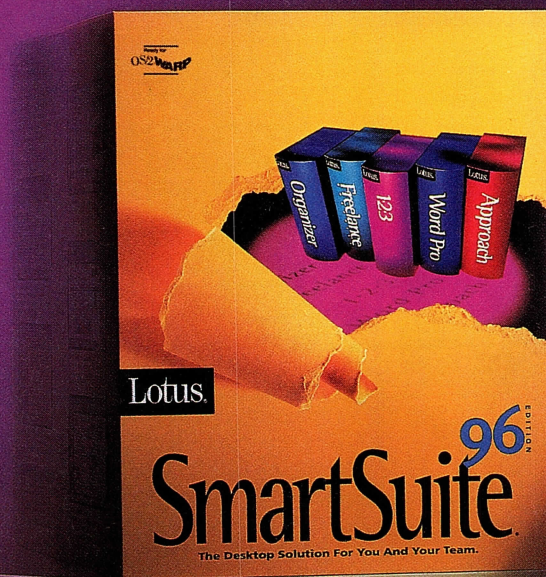
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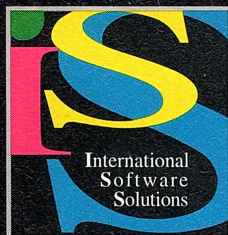
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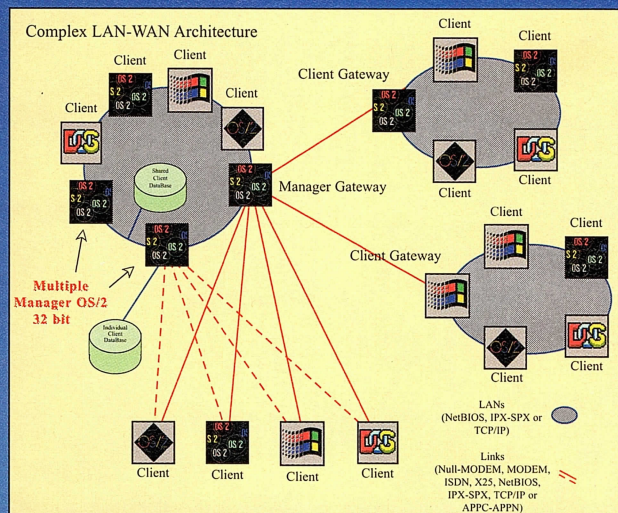
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Australian Personal Computer March 96

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Perspectives

The Java Launch

San Francisco, September 25, 1996—At a gala event at the city's Yerba Buena Center for the Arts, IBM launched its newest Intel-based desktop operating system: OS/2 Java 4.0. Or was that Java Warp 4.0? Java Netscape 4.0?

Silly me. The announcement was for OS/2 Warp 4.0, formerly known as Merlin. IBM is excited about the platform's built-in VoiceType speech recognition, as well as its support for Sun's Java language. OS/2 Warp 4.0 plays strongly to IBM's vision of network computers, able to run Java applications across the Internet and corporate intranets. OS/2 Warp 4.0 is also strategic for IBM because you can run Java applications not only within Netscape's Navigator 2.02 for OS/2 (coming soon) but also directly on the desktop. OS/2 Warp 4.0 brings IBM forward in its support of important industry standards, like Java, OpenDoc, and Open32 (Microsoft's Win32 API set).

IBM chose *not* to use this occasion to clearly define the importance of OS/2 Warp 4.0 itself as a strategic platform.

Instead, executives like John M. Thompson, senior vice-president of the IBM Software Group, used this opportunity to discuss their vision of "network computing," that is, Java. Mr. Thompson only mentioned OS/2 once, in passing, during his carefully scripted presentation—and didn't take questions from the assembled reporters. (A senior IBM press-relations person later told me that it wasn't Mr. Thompson's job to talk about OS/2.)

Instead, IBM used this event to talk about how each of IBM's four operating systems (OS/2 Warp, AIX, MVS, and OS/400) will be Java-enabled by the end of the year. It's fair to surmise that IBM's software group is betting the business on Java. From its anti-Microsoft perspective, Java is compelling, because Java applications are truly platform-independent, as long as you have a browser or operating system that supports Java itself.

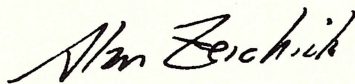
In theory, Java could make Microsoft's Windows 95/NT hegemony irrelevant—if developers choose to stop writing applications to the Win32 API set and adopt the Java APIs instead. The fact that OS/2 Warp 4.0 is the first Intel-based operating system to have built-in Java support is, therefore, very important. But what will happen when Microsoft adds Java to Windows? And if the client operating system is unimportant, why

choose OS/2 instead of its competitors? IBM never discussed that issue.

So, we will. Here's one compelling reason to choose OS/2 Warp 4.0: VoiceType. It's too bad that it was treated as a novelty, a gimmick. Rather than showing how voice recognition will enable whole new classes of applications, or how the microphone will bring computing to workers who lack the ability to type, we heard, "Imagine sitting in your favorite chair, TV remote in one hand, soft drink in the other, navigating the Web using voice commands." *Hmmmm. Strategic?*

The low point of the OS/2 Warp 4.0 launch was Lotus's demo of prerelease Freelance and WordPro code; I remember seeing alphas at Lotusphere last January. Lotus promises those products will be finished by the end of the year. What about 1-2-3, Approach, and Organizer? The latest commitment is for sometime in the first half of 1997. Hey, the 32-bit SmartSuite for Windows 95 began shipping in November 1995. Are we supposed to be impressed? Get Lotus off the stage until it actually delivers on its promises.

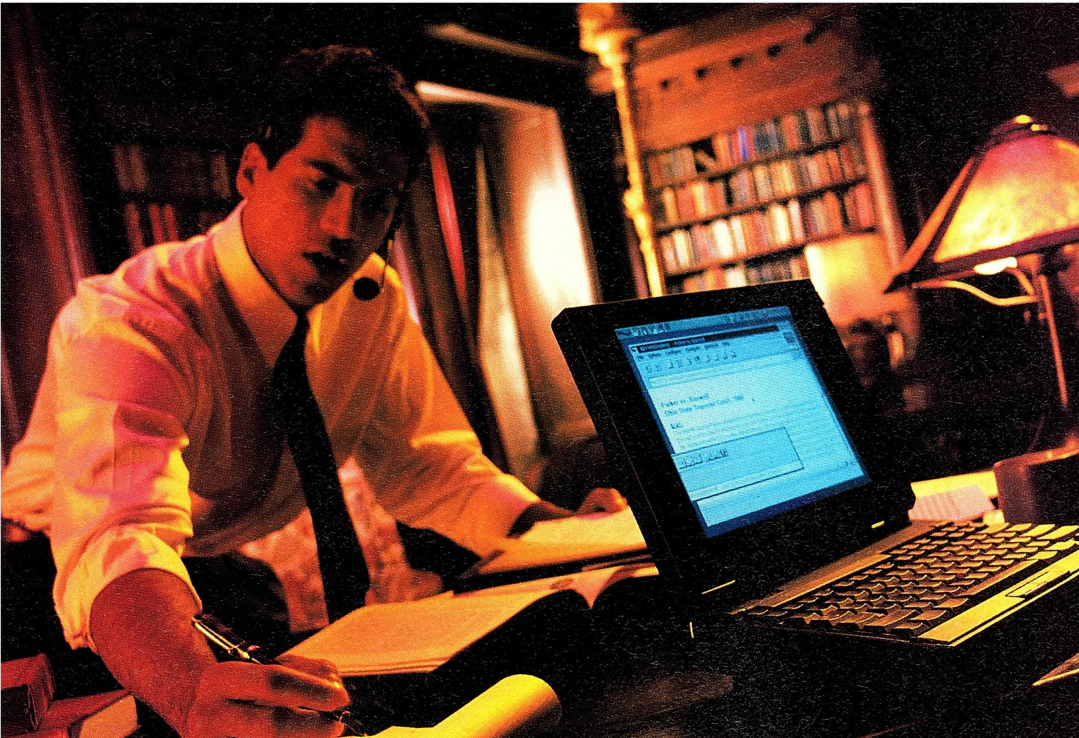
The high point was the brief demonstration of Citrix's WinFrame support of 32-bit Windows applications under OS/2. WinFrame is a modified Windows NT server that runs all 32-bit Windows apps, such as Microsoft Office 95. With the Citrix client running in a Win-OS/2 session, you can run apps that reside on the WinFrame server inside the Workplace Shell. Thanks to Citrix, one of the biggest criticisms of OS/2 Warp—that it can't run Windows 95/NT applications—has been circumvented. Don't try this at home: Citrix's WinFrame license costs \$6,000 for 15 concurrent users, plus \$200 for each additional user—but it's just what the doctor ordered, if your business needs a particular Win32 app. Now, *that* is strategic.



Alan Zeichick
Editor-in-Chief

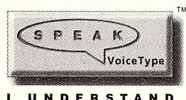
(P. S. Did we mention that OS/2 Warp 4.0 supports Java?)





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Letters

**"Sorry IBM. I will stick to OS/2 3.0,
with no FixPaks, thank you very much."**

Clarification please

Dear Editor,

In "A Kilometer Is Not a Kilometer" (September 1996, pp. 42-46), Roger Sessions wrote about *object programming*, *object-oriented systems*, and the cost of invoking a *method*. I have only a rough idea of what the italicized terms mean. Please provide concise and exact definitions of the terms, assuming no knowledge of C++ syntax and semantics. It seems to me that your measurements can be equally applicable to solving problems on the ancient Dartmouth Basic time-sharing system.

Sy Wong

*Objects are software gremlins that can do things for us. Exactly what they can do is determined by their type. For example, gremlins that are of the type **dog** may be able to bark. Gremlins that are of the type **warehouse** may be able to give us a count of the number of diapers that are in stock.*

*We think of specific gremlins as representing specific real-world objects. For example, we might call on a gremlin of type **bankBranch** to serve as a software counterpart to the real-world North West Austin Branch of the Texas Bank. Then, when we ask that gremlin to give us a branch total, we understand that we are asking for the software equivalent of how much money is physically in the real branch building.*

When we write software programs that work by using these gremlins, we are doing what is called object programming. The software systems that we so develop are called object-oriented systems. The behaviors that these gremlins can perform are formally called methods, and the act of asking a gremlin to perform a behavior is formally called invoking a method on the object (gremlin). So invoking a method just means asking one of these gremlins to perform some specific behavior for us, such as getting a branch total.

You say these measurement tech-

niques could be applied to many non-object-based systems. I say, "Excellent observation!" This is why these techniques are so helpful, because they help quantify the cost of object-oriented programming and allow us to compare it to the cost of more traditional programming styles.

Roger Sessions

Thanks, but no thanks

Dear Editor,

I always enjoy reading articles by Brian Proffitt, and I have no complaint about his piece "Merlin Means Magic" (October 1996, pp. 20-25). What does make me unhappy is the discovery that IBM has once more left the little guy on the outside with its choice to distribute OS/2 solely on CD-ROM. I would love to have a CD-ROM drive, but at this time my business doesn't need it. I've been running a 486DX50 system with 16MB RAM and a 540MB hard drive for several years, first using OS/2 2.1 and then later 3.0 for its multitasking. While the selection of programs has been limited, it has been a better operating system than DOS for what programs I do have and has run the few Windows programs I needed very nicely. In short, it does everything that I need it to do.

Now IBM apparently believes I'll hop right out and pop for that new 90+MHz Pentium system with over 24MB RAM in order to use the speech system. Don't forget you will need a multigigabyte hard drive, too! And as for installation difficulties, just struggle along like you did before, right?

Sorry IBM. I will stick to OS/2 3.0, with no FixPaks, thank you very much. I'll also be trying out Windows programs as replacements for my current DOS and OS/2 programs. Looks like Windows 95 will be my next purchase; in fact, it'll probably come pre-installed if I do upgrade my system. I hope for the sake of IBM's employees that the corporate clients will be enough to keep the bottom

line. I've seen a lot of folks leave Boca Raton without a job in recent years, thanks to IBM's corporate strategy.

Doug MacCoy

Remote Services Management

Dear Editor,

I'd like to personally thank OS/2 Magazine for the excellent review of our product, Remote Services Management (RSM), in your September 1996 issue. Your reviewer, Brian Proffitt, showed a good understanding of remote users, especially those needing Help Desk support. However, I would like to clarify a couple of points.

First, in the review, it was mentioned that technical support was only available through CompuServe or distributors. International Software Solutions (ISS) has always provided direct phone technical support in the countries where ISS offices exist. The confusion may have arisen because, until recently, RSM was sold in North America exclusively through a distributor. This is no longer true. In February 1996, ISS terminated its exclusive relationship and formed International Software Solutions USA in West Palm Beach, Fla. One of the primary objectives of this office is to provide improved customer service and responsiveness to our existing and future North American customers. Any RSM customer is welcome to call our hotline at (407) 804-9067 from 8:30 a.m. to 5:00 p.m. Monday through Friday EST.

Second, the article indicated that RSM contained no uninstall routine. This is not true. When you invoke the install program, one of the first options is to remove existing versions. The Remove option allows you to eliminate either the programs only or the programs and the configuration files.

Philippe-Charles Krug-Basse
President

International Software Solutions



Connect the World

BY TOR D. BERG

While certain high-level executives at IBM may be "happy" with OS/2's "installed base," a cadre of dedicated OS/2 users certainly are not. On October 26, a large group of volunteer OS/2 evangelists set out to spread the Word of OS/2 Warp 4.0 in an event called Connect the World with Merlin. Literally hundreds of users were organized—globally by Tim Bryce of M. Bryce & Assoc. in Palm Harbor, Fla., and locally by scores of user groups—to demonstrate the new version of OS/2 at universities, computer stores, and many other user sites over the course of a 35-hour period.

Roger Niclas, editor of the *OS/2 Bay Area News*, a newsletter published by a Calif.-based OS/2 user group, volunteered to do his duty at a Fry's Electronics store in Silicon Valley. "Among the OS/2 user community are people who are strongly devoted to the platform, and they realize that there's a difficult row to hoe in terms of finding shrink-wrapped products for OS/2," explained Mr. Niclas. "So in a way, we're doing this out of enlightened self-interest. We're trying to spark a larger interest in OS/2. And, by holding the event at computer stores, we're hoping to show the retailers that there is, in fact, an interest in OS/2."

The event offered several innovations, beyond the concept itself. Users at demonstration sites accessed the Internet through the recently released native Netscape Navigator for OS/2 and used the browsers to build a map of the world showing locations where OS/2 is used.

The demonstrated software represents the ISVs' best efforts to optimize their products to exploit OS/2 Warp 4.0's capabilities. SPG's ColorWorks graphics software, Lotus's WordPro word processor, Mount Baker Software's new Money Tree financial planner, and Revolutionary Software's InterCom Internet telephone are all written for OS/2's 32-bit processing, are all multithreaded, and are all speech-enabled.

"I welcome the opportunity to meet other OS/2 users, those with more knowledge and experience than me," said Mr. Niclas, while preparing for the event. "And the challenge of just pulling this thing off...it's a huge undertaking."

Other product demonstrations included applications from the Application Sampler CD-ROM, which is being shipped with OS/2 Warp 4.0. The CD-ROM contains over 70 trial

OS/2 APPLICATIONS TOP 15 LIST—SEPTEMBER 1996

This Month's Rank	Last Month's Rank	Product	Company
1	-	Avarice: The Final Saga	Stardock Systems
2	-	Object Desktop 1.5	Stardock Systems
3 (tie)	1	IBM AntiVirus Desktop Ed.	IBM
3 (tie)	2	Partition Magic 2 Personal Ed.	PowerQuest
4	4	System Commander 2.2	V Communications
5	10	Object Desktop Professional	Stardock Systems
6	6	UniMaint 5.0	SoftTouch Systems
7	7	BackAgain/2 4.0 Prof. Ed.	Computer Data Strategies
8	13	Sytos Premium 2.1	Arcada
9	-	DeScribe Voyager Plus CD	DeScribe
10	12	GammaTech Utilities 3.0	SoftTouch Systems
11	15	ColorWorks 2	SPG
12 (tie)	11	Hobbes CD-ROM Archive	Walnut Creek
12 (tie)	-	BackMaster 2.0	MSR Development
13 (tie)	5	Faxworks Pro 2.0 Upgrade	Global Village
13 (tie)	-	Unite CD-Maker 2.0	Cirrus Technology
14	-	Bitstream Font Collection for OS/2	Bitstream
15 (tie)	-	CopyShop/2	Trafalgar Business Systems
15 (tie)	8	Seagate Backup 2 Personal Ed.	Seagate

Since OS/2 Warp and OS/2 Warp Connect are consistently ranked as top-selling products, and sales of additional licenses can sometimes skew results, this list has been modified to highlight only the top-selling OS/2 applications. (Best-seller information courtesy of Indelible Blue.)

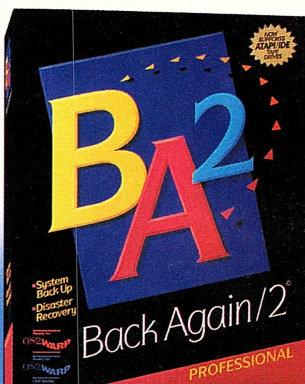


Maybe It's Time to Check Into a Good Recovery Program.

Needing intervention? A malfunctioning computer can cause dysfunctional behavior. Protect your work, your computer and your sanity with Back Again/2™, the ultimate backup and recovery for OS/2 Warp.

Now upgraded to version 4.0, you get all of BA/2's 32-bit power and broad device support, plus major enhancements. The integrated Workplace Shell Interface lets you back up and restore with "drag and drop" ease. Schedule any object such as a backup set, program, or REXX script to begin at a single date and time, a timed interval, or a combination of days at a chosen time. All by simply dragging it into the new Backup Scheduler folder! Configure any external command to execute before or after a backup is performed.

Ready for
OS/2 WARP
NSTL Tested



Estimate both backup time and size, plus many more configurable options.

And, BA/2 has enhanced its robust network support. It automatically finds network resources such as LAN Server and Netware File Servers. You can also back up LAN Server ACL (Access Control Lists) automatically.

Now say this affirmation out loud, "Today I will buy BA/2 4.0, because I'm worth it." Preventive mental health begins with BA/2 4.0, the one-step recovery program.

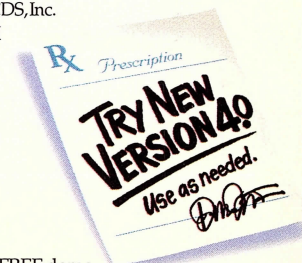
Supports SCSI and ATAPI/IDE tape drives, networks, removable cartridges and floppy disks

System requirements: IBM OS/2 2.1 or greater

¹BackAgain/2- Copyright CDS, Inc.

²OS/2 is a trademark of IBM

CDS
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For more info call CDS at 800-284-4156 or 612-730-4156. Visit our web site at <http://www.cds-inc.com> for a FREE demo.

Reader Service No. 5

versions and limited editions of native OS/2 applications. Some of the more interesting programs include Clearlook 1.7 (OpenDoc-enabled word processor), StarOffice (Internet-enabled office suite), Back Again/2 (backup software), UniMaint (file manager), Mesa2 (OpenDoc-enabled spreadsheet), and Unite CD Maker.

Connect the World with Merlin included 130 registered sites in 22 countries. But because the event was facilitated by the Internet, hundreds of volunteers were able to log in and conduct informal presentations with a connected PC running OS/2.

Mr. Niclas himself remains the dedicated but realistic OS/2 user. "Afterwards, the question will remain, if some guy sees OS/2 Warp 4.0 and says, 'Wow, that's pretty cool,' and walks into Fry's to pick up the package, will he find software to use with it?"

Supplying servers

According to numbers published by

International Data Corp. (IDC), a research firm specializing in market information for the IT industry, OS/2 servers expanded their worldwide market share from 14.1% at the end of 1995 to 15.2% after the first half of 1996. IDC defines market share as the number of new shipments and upgrades. These market gains were probably a response to the release of OS/2 Warp Server in late February 1996. Indeed, OS/2 servers increased their market share 5% in the second quarter of this year over the first quarter.

With these impressive numbers, OS/2 servers maintained the number two position in total server-installed base, second only to Novell NetWare and surpassing all UNIX systems combined.

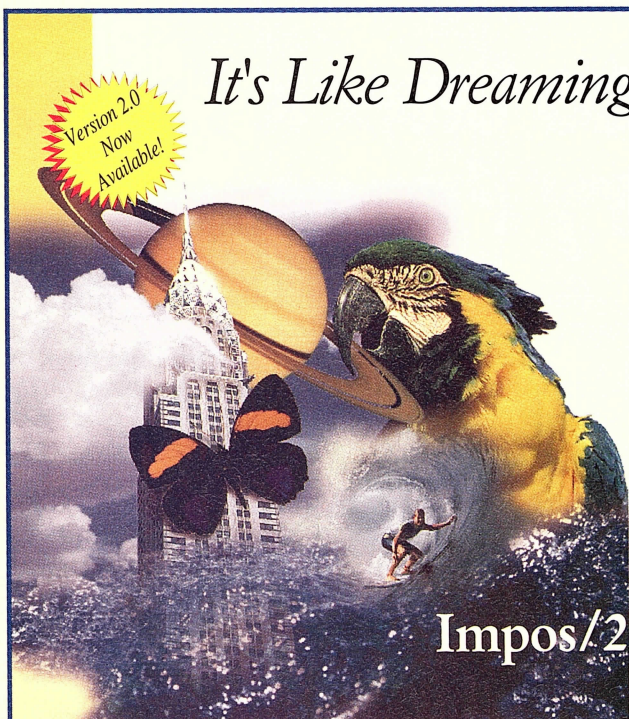
Statistics are a tad lifeless, though. Just who are using the OS/2 servers? Recent contracts include 300 OS/2 Warp Server licenses for the State of California, 1,600 licenses for Banca Commerciale Italiana in Milan, and 900 licenses for Dean Witter. With

customers like that, who needs other customers?

OS/2 servers should receive another bump with the recent release of a symmetric-multiprocessing (SMP) feature for OS/2 Warp Server Advanced. With SMP, software servers can use multiple processors with the same software. You'll get high-performance and the ability to consolidate network servers. With the ability to support up to 64 processors, IBM's SMP solution is defining the technology in terms of scalability. And if that's not enough, the SMP release is a *free* upgrade for users of OS/2 Warp Server Advanced.

Surreality

OS/2 standby Crunch Products is now known as dadaware Inc. to more aptly reflect the "dreamlike" capabilities of the company's graphics software products. Dada was a turn-of-the-century surrealist art movement—very appropriate for this surreal segment of the computing industry. **OS/2**



**Version 2.0
Now Available!**

It's Like Dreaming With Your Computer

Impos/2

**Available Through Indelible Blue 1-800-776-8284
or <http://www.indelible-blue.com/ib>**

OS/2 is a registered trademark of IBM Corporation. All other registered trademarks belong to their respective owners. This ad designed at Indelible Blue on a PC running fast and crash-free under OS/2 Warp.

They say a picture is worth a thousand words, but what words are your pictures saying?

Impos/2, the ultimate 32-bit image processing application for OS/2®, gives you the creative confidence to launch into the fascinating world of electronic image processing.

Take images and manipulate them every way imaginable. Impos/2 even lets you work on several views of one image at the same time!

An extensive choice of tools such as magic wand, rectangular, circular and freehand selections make it easy for you to handle complex image selections, and to do a little dreaming.



**EDITORS' CHOICE AWARD
OS/2
MAGAZINE
1995**



**Best of
OS/2
1994**
OS/2 Inside
Reader Award



**INDELIBLE BLUE
Inc.**

**Outfitters For The
Information Frontier**



com part

Molding A Design

BY ALAN S. KAY

“OS/2 has found a solid home in the enterprise.” Sound familiar? It certainly does to me. I’ve heard it regularly over the past two years as IBM partisans have tried to shift attention from OS/2’s failure in the consumer marketplace.

Enterprise conjures up images of cubicles in a high-rise office tower. But OS/2 is hard at work in other sorts of enterprises as well—not only enterprises in which customers are tracked by the thousands but those in which thousands of components are melded together into a complex tool.

Or in this case, where boards are cut by the thousands of running feet. Normac Kitchens Ltd., a 25-year-old Canadian company, contracts with Canadian and, through its U.S. subsidiary, U.S. builders to manufacture and install kitchen and bathroom cabinets. At its head office and factory in Thornhill, Ont., Normac produces cabinets at a furious pace. Although a single job may include only a few models, small variations require that each unit be custom built.

At one time, design layouts for cabinetry were hand drawn by sales reps, then redrawn for production—a tedious and error-prone process.

Enter Jay Schwartz’s Elipse Ltd., a Toronto-based software consulting firm. Normac General Manager Ross Burnett recalls that the company turned to Schwartz after deciding to computerize its ordering operations.

To provide Normac with automated design, Mr. Schwartz developed a Presentation Manager program that runs under OS/2. It was written in C using IBM’s VisualAge C++ compiler.

The software wasn’t tossed off in an afternoon. Its 42 modules run to more than 32,000 lines of code. But running on five Pentium PCs networked with an OS/2 Peer LAN—and on stand-alone PCs in branch offices in Charlotte, N.C., Dallas, Tex., Kansas City, Mo., Portland, Ore., and Vancouver, B.C.—the software gives Normac new levels of both reliability and flexibility. It allows a master layout for each model to be modified for an order. It then generates laser-printed lists and drawings of cabinets and doors for the shop as needed.

The package is built around a home-built text database that stores design masters, inventory, and pricing data, indexed by cabinet code. (Given the unlimited virtual memory capacity of the operating system, the program reads the entire 2,975-cabinet database into memory at startup.) Standard units can be modified to fit blueprints and aggregate parts lists can be generated for multiple units.

“I chose OS/2 for its performance capabilities,” says Mr. Schwartz. “It can do complex calculations in real time. It allows standardization because there’s a uniform set of APIs. We need to use it on multiple systems and don’t want to customize it each time.”

The software consists of a set of linked C structures that are called by choosing from lists of builders and locations; the program dynamically maintains the indexes. The executable is an efficient, multithreaded 300K package that runs well on 16MB of memory on 486es as well as Pentiums.

Normac’s production design software remains an open project—Elipse just delivered an upgrade in late sum-

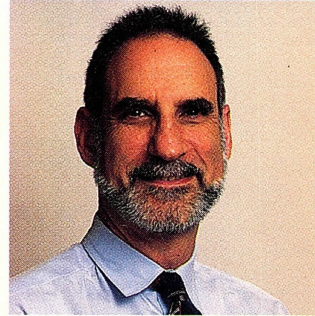
mer that will produce a single combined door list for multiple layouts, allowing better inventory control and planning when several kitchens are ordered for the same building or subdivision. Discussions are currently underway about an enhancement that would show elevation views—potentially a strong selling feature to architects—and about synchronization of the remote copies of the database via the Internet.

Normac didn’t set out to run its production design operations in an OS/2 environment. It simply wanted a current technology tool. But it’s an OS/2 shop now, thanks to Elipse, which is, in effect, Normac’s outsourced design IS department.

“Yes,” Mr. Schwartz acknowledges, “NT, 95, and UNIX do these things, too. But as a programmer, I can appreciate the elegance of OS/2. It’s a very efficient operating system. Users such as Normac can use OS/2 to run DOS and Windows programs as well as the drawing program. While UNIX is also an efficient system, it suffers in the area of compatibility. OS/2 is the best of both worlds.”

Normac itself may never make the glossy business magazine write-ups of cutting-edge technology, and it will be some time before Mr. Schwartz is listed among the top integrators and software consultants. But the thousands of Normacs and hundreds of Elipses doing business every day are the key to OS/2’s survival. **OS/2**

Alan S. Kay covers business technology from Washington, D.C., and San Francisco. Send e-mail to ask@well.com.



Just Announced

WinFrame Enterprise 1.6

Windows apps for OS/2 clients

Citrix Systems Inc. has announced that its WinFrame Enterprise 1.6 applications server is now available for OS/2. Using WinFrame, 16- and 32-bit Windows applications can be run in a Win-OS/2 session, either full-screen or in a seamless Workplace Shell window.

WinFrame Enterprise consists of two components. The WinFrame server is a modified Windows NT server and supports any application that can run under that operating system, such as Microsoft Office 95. The WinFrame client, which runs inside an OS/2 workstation's Win-OS/2 environment, can remotely run any application installed on the WinFrame server over a LAN, WAN, Internet, or intranet connection, with full access to local information stored on the OS/2 client system.

The OS/2 client runs on OS/2 2.11 or later; other versions of the Citrix client are available for DOS, UNIX, and Macintosh.

WinFrame Enterprise 1.6 has a list price of \$5,995 for 15 concurrent users; additional user licenses cost \$995 for a set of five.

Citrix Systems Inc., (954) 755-0559, fax (954) 341-6880, or see its Web page at <http://www.citrix.com/default.htm>.

READER SERVICE NO. 101

Developer/2000

Cross-platform development

Oracle Corp. has announced Developer/2000 for OS/2, the latest port of the company's second generation client/server development tool. Along with native support for the Windows 3.x/95/NT, Motif, PowerMac, and Mac 68K environments, Developer/2000 also enables reports to be deployed on intranets and the Internet in HTML or Adobe's Portable Document Format.

The declarative capabilities of Developer/2000 let developers create applications from database definitions without writing a single line of code. Developer/2000 also implements rapid application design techniques, object orientation, and unified client and server support.

Oracle Corp., (415) 506-7000, or see its Web page at <http://www.oracle.com>.

READER SERVICE NO. 102

Mesa2 2.1.6

OpenDoc and OS/2 Warp 4.0

Sundial Systems has released 2.1.6 of its Mesa2 spreadsheet to coincide with the launch of OS/2 Warp 4.0.

Mesa2 2.1.6 brings many substantial improvements to its previous version, including a reduced memory footprint and a faster recalculation engine. Users will find improved support for international settings; REXX support for Mesa2's unique feed/signal interface is also available. Graphic objects can now also be DDE-linked to other applications. Other features include formula functions, scripting functions, and enhanced import/export support for other spreadsheet formats.

Mesa2 2.1.6 retails for \$179.

Sundial Systems, (310) 596-5121, e-mail order@sundialsystems.com, or see its Web page at <http://www.sundialsystems.com>.

READER SERVICE NO. 103

FaxWorks Pro

Enhanced fax communication software

Global Village has enhanced its FaxWorks Pro for OS/2 line of communication software.

FaxWorks Pro for OS/2 3.0 includes telephony features, such as voice mail, message forwarding, fax-on-demand, paging, and remote message retrieval. Users can forward faxes and voice mail to e-mail mailboxes. FaxWorks Pro LAN for OS/2 3.0 includes CSID and OCR routing. Both FaxWorks Pro products support OS/2 Warp 3.0 and 4.0.

FaxWorks Pro for OS/2 3.0 has a retail price of \$129. FaxWorks Pro LAN for OS/2 3.0 starts at \$499. Upgrade pricing is available.

Global Village Communications Inc., (800) 329-9675, fax (408) 523-2546, or visit its Web page at <http://www.globalvillage.com>.

READER SERVICE NO. 104

Scratch-N-Post 2.0

Personal task manager

SoftPaw Development has released Scratch-N-Post 2.0, a personal reminder and task manager software product for OS/2.

Scratch-N-Post lets you create events that will "pop up" reminders for meetings, pay bills, run other programs on a recurring basis, and so on. It features flexible event scheduling and allows logical groupings for viewing, sorting, printing, and maintenance. The user interface has been completely revised.

List price for Scratch-N-Post is \$35; registered users of earlier versions will be automatically updated for free.

SoftPaw Development, (770) 998-2193, fax (770) 998-2193, or e-mail 74654.1725@compuserve.com.

READER SERVICE NO. 105

Secure GenTicket

Single sign-on security product

Pinnacle Technology has announced the availability of Secure GenTicket.

Secure GenTicket offers single user ID and password access to appropriate system-wide resources and encrypted, time-sensitive passwords between secondary resources. Once users are authenticated by a trusted server, such as OS/2 Warp Server, they can have appropriate access to other secondary resources, such as those administered by RACF, ACF/2, Top Secret, Oracle, and Windows NT.

Secure GenTicket site licenses start at \$3,000 per server.

Pinnacle Technology, (317) 279-5157, fax (317) 279-8039, e-mail sales@pinnacletech.com, or see its Web site at <http://www.pinnacletech.com>.

READER SERVICE NO. 106

InnoVal News

Post Road Mailer 2.5 and Post Road NetExtra

InnoVal Systems announces the release of two editions of Post Road Mailer 2.5 for OS/2 and an add-on tool for Netscape Navigator for OS/2.

The add-on tool, called Post Road NetExtra, provides advanced bookmarking into nested folders, nicknamed page retrieval, multiple-month history of all visited Web

pages, a persistent jump list that is carried forward from session to session, a local agent for downloading a series of Web pages to a user's hard drive, and offline viewing. Post Road NetExtra has a list price of \$49.

The two editions of Post Road Mailer 2.5 are: an Internet/intranet edition, which uses TCP/IP; and a PROFS edition, also called the Blue Edition, which provides online and offline mail processing for users of IBM's OV/VM mainframe e-mail system.

The Internet edition, Post Road Mailer Pro, supports multiple accounts, nested folders for message organization, multiple address books, mail filters, built-in FTP, newsgroup postings as mail, and programmable user exits. Both editions integrate with Netscape Navigator and support the SpellGuard multilingual add-on spell checker.

InnoVal Systems Solutions Inc., (914) 835-3838, fax (914) 835-3857, e-mail innoval@innoval.com, or see its Web page at <http://www.innoval.com>.

READER SERVICE NO. 107

Just Announced OS/2 Internet Sites

Timur's OS/2 Programming Page

<http://www.shirenet.com/~crusader/Timur/os2prog.html>

The definitive site for OS/2 programming information.

CSD Central

<http://www.netaxs.com/~jeanluc/os2/csd/>

One stop for all your "fix" needs.

Complete OS/2 Links Page

<http://www.augusta.net/~aphillips/links.html>

Need to find something OS/2-related? Check here for a pretty extensive listing.

OS/2 Computing!

<http://www.iceonline.net/home/ronnyk>

A new OS/2 online publication that includes feature stories, editorials, first looks, and more.

The San Diego OS/2 User Group

<http://www.teamos2.org/ug/sdos2ug/>

Information on the User Group—upcoming events and links to other OS/2 pages.

UPDATED:

Warp Online ezine:

<http://www.warponline.com/>

OS/2 Warp "Must Have" Utilities:

<http://www.musthave.com/OS2>

(Information courtesy of Vicci Conway, vicci@ibm.net.)

PhotoGraphics Pro

Enhanced object-oriented graphics package

T rueSpectra Inc. plans to ship an enhanced version of PhotoGraphics Pro, an object-oriented graphics package, on November 1, 1996.

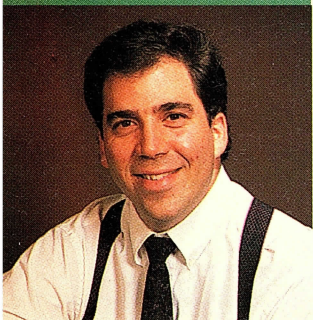
PhotoGraphics Pro features TrueSpectra's ColorWave render engine. The package offers vector draw—both freehand and line—and photo-composition capabilities. It includes support for REXX scripting and OpenDoc "container" functionality.

PhotoGraphics Pro costs \$249.

TrueSpectra Inc., (416) 224-0076, fax (416) 224-0309, e-mail sales@true-spectra.com, or see its Web page at <http://www.truespectra.com>.

READER SERVICE NO. 108

OS/2



Dual Boot, .ini Files, Java on Merlin, and More

BY DAVID REICH

TIP 262

./INI/BLOAT

Q: I've been using OS/2 for several months. I recently ran UniMaint on my .ini files. It found and deleted hundreds upon hundreds of invalid file and folder references. There appeared to be entries for every file I had ever looked at on my CD or floppy drives, every file or folder I had ever moved, renamed, or deleted, every temporary file created by any application, and even every Web page I had ever visited. After about 30 minutes, I regretted choosing the Ask Before Delete option. My .ini file has shrunk considerably.

Is OS/2 supposed to behave this way, or is this a bug? I know making the .ini files binary is supposed to improve performance, but it also keeps us from browsing the files for extraneous garbage. Does this file bloat hurt performance?

A: The .ini file support code in OS/2 has a compaction routine that gets run when the unused space in the .ini file is a certain percentage of the total file, which triggers the compaction. Depending on the version of OS/2 you have, the parameters to this function have changed to compact more or less often. In some cases, the routine just does not run for some reason—if, for example, the current values are just barely below the threshold. So, the code is there, and it works, but you found a situation in which it just did not run.

The bloat does not hurt performance, although it can be annoying to have such large .ini files. As you

have already discovered, third-party utilities are available, shareware and otherwise, to manually compress your .ini files.

TIP 263

PRELOAD DUAL BOOT

Q: I have been struggling with a problem involving Dual Boot with DOS/Windows 3.1 and OS/2 Warp Connect. The situation: DOS/Windows was installed on a clean hard drive, then OS/2 Warp was installed. In this install scenario, OS/2 correctly builds the Dual Boot icon, and the transition from OS/2 to DOS/Windows works correctly. The problem is getting back to OS/2 from DOS/Windows. I have noticed that on systems that were preloaded with a Dual Boot environment there is an icon in Windows called GoToWarp. I have tried to chase down what is behind this Windows icon but to no avail. Can I create something that will get me back to OS/2 Warp from an icon? It is not acceptable to require my users to end Windows and enter the command `c:\os2\boot /os2`. They are not techies and get confused if they can't double-click on an icon.

A: A special program is available on preloaded systems that not only does the `boot /os2` for you, but also suppresses the confirmation queries that Windows displays. This special program is a front-end to `boot.com`. The preloaded systems also have an icon already set up in Windows that enable you to invoke the program.

For nonpreloaded dual boot sys-

tems, you can create an icon to do the `boot /os2` for you, but you'll have to answer the confirmation requests that Windows sends when shutting down, such as the "are you sure" message. You'll create an icon to access `boot.com` by doing the following:

- 1) Go to the Program Manager while booted under DOS/Win. Select File, and then select New.
- 2) Select Program Item.
- 3) Enter the description in the Description field.
- 4) For Command Line, enter `c:\os2\boot.com /os2` (or whatever drive letter you boot OS/2 from).
- 5) For Working Directory, enter `c:\os2` (or the OS/2 boot drive).

Save the settings, and your icon is there for you. You can use Windows to change the icon once it has been set up. Double-clicking on that icon will boot you to OS/2 after you answer the questions.

TIP 264

MOVING DESKTOPS

Q: We are upgrading PCs with larger hard drives. To appease the DOS/Windows users, I have installed OS/2 Warp and Boot Manager at the "end" of the drives. That is, with the larger drives, I would like to move OS/2 Warp from, say, d: to g:. I am aware of updating `config.sys`, but is there any way to update `os2.ini`, `os2sys.ini`, and the desktop itself? The MAKEINI utility does not preserve your customizations, nor does it recognize the old desktop.

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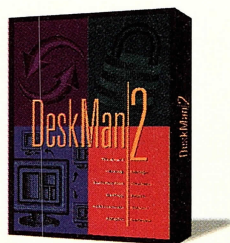
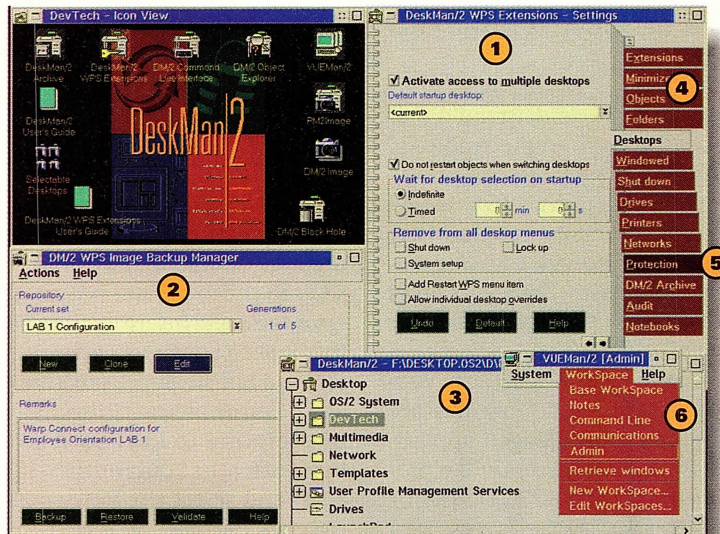
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Reader Service No. 7

A: There is no reliable way to move between drives that are built into the system. While it is possible to drag and drop the desktop onto another drive, because so many interdependencies exist between the different system structures, this process is error-prone. You could, however, before installing on the new drive, use a Workplace Shell (WPS) backup utility like Deskman/2 or Object Desktop to back up the shell configuration. You can then restore (actually, recreate) the WPS configuration on the new drive with the tool you used to back it up.

TIP 265

JAVA ON MERLIN

Q: I just got a copy of the new OS/2 Warp 4.0. I know it has Java support built into it, but I don't know how to use it. I know that browsers can run things written in Java, but I don't have one of those for OS/2, and I have heard that Merlin has Java "built-in" to the operating system. What does this mean? How can I run Java programs?

A: The first thing to understand is that Java is still a very young technology. Today, Java is primarily used for writing small bits of programs, often called applets, that perform simple tasks. Many are written just to provide a level of animation to Web pages. Some examples are scrolling text or "LED" signs you may have seen on some Web pages.

Java is much more than just Web page applets. Some companies are now developing full-fledged applications using Java, because, unlike programs written for OS/2, UNIX, or Windows in its various flavors, Java programs will run on any system that supports it. Starting with 4.0, OS/2 Warp is such a system.

OS/2 Warp 4.0 has Java built in. The run time (the part of any system that is required to run programs for it) for Java is installed on your system by default, in just the same way the OS/2 kernel or graphical subsystems are installed. You also have the option to install the Java programming toolkit. This toolkit, as the name implies, pro-

vides the tools to write your own Java programs. If you want to just run an application that requires Java, just run it. The run time is always installed and ready to go.

If you want to look at Java itself, to see what it's about and to try some things out for yourself, whether or not you're a programmer, you can use Selective Install to install the Java programming toolkit, which comes with a set of ready-to-run samples. To run the samples, open the Programs folder, then open the Java for OS/2 folder, and finally, the Samples folder. Two objects are in it. One is Demo, where you can see the HTML for the samples, as well as some of the code for them. To run the samples this way, you will need to use the right button on the mouse to drag and drop the HTML onto the Java Applet Viewer from the HTML object, and the applet viewer will start the selected applet.

The other, easier way to run the applet is to open the URLs for Samples folder in the Samples folder. Double-left-click on any of them, and the applet viewer will start the selected applet.

TIP 266

BOOT WITHOUT CD

Q: My friend and I are both having the same problem. If we boot without a CD in the drive, the system gives an error message. Inserting the CD allows the boot to continue correctly. If I select the Ignore and Continue option on the error message, the system will not respond to keyboard or mouse input after the boot finishes. If I insert a CD and select the Retry option on the error message, all is well. An audio CD will *not* work, creating the same problem as no CD. Otherwise, this last method seems to work as long as the CD I use is not Audio.

A: I would suggest that something in your boot sequence is trying to start (or restart) on boot, and it points at the CD drive. You should look to see if you have anything in your *config.sys* file that references the x: drive (where x: is your CD). You may have an autostarting ob-

ject that references the drive. It could even be just a folder reference on the desktop that comes from the CD.

First, make sure nothing in *config.sys* references the CD drive letter (things in PATH, LIBPATH, or DPATH are okay). Then, shut down and reboot. When you reboot, as soon as you see the clock come up, press and hold the <Ctrl>, <Shift>, and <F1> keys until the desktop is completely up. This key sequence suppresses the auto-start of all objects in your system other than those in *config.sys*, including anything that was running at the last shutdown and objects in the Startup folder. It also inhibits the processing of *startup.cmd*. If this key sequence does not work, you might also try editing *config.sys*, removing the LaunchPad entry (WarpCenter entry if you're on OS/2 Warp 4.0) from the AUTOSTART line, and then rebooting your system.

TIP 267

FIXPAK NUMBERING

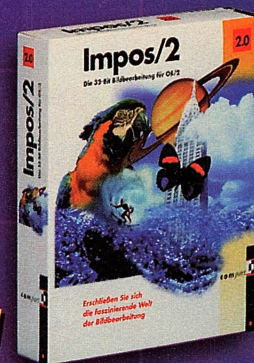
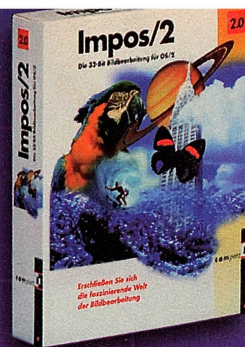
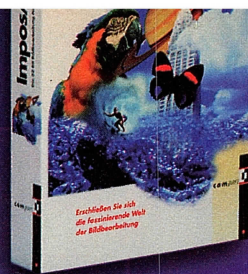
Q: Would you please take a moment to explain the difference between public and private FixPaks?

A: Very good question. The FixPaks are numbered according to IBM's internal build numbering system. FixPaks are built regularly, based on field-reported problems (APARs) and, periodically, a FixPak is released to the public. The apparently large number of FixPaks, which may make some people uncomfortable, is an artifact of this building system. For example, FixPak 17, released in early 1996, is only the third public FixPak for OS/2.

By the time you read this column, FixPak 25 or 26 should be the most recent (fourth) public FixPak. OS/2

David Reich has been with the OS/2 development team since 1987. David is a contributing editor and is the author of Designing High-Performance OS/2 Warp Applications, published by John Wiley and Sons. Questions can be addressed to David via CompuServe at 76711,632 and via the Internet at speedracer@austin.ibm.com.

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interface	Adaptec 1502E-ISA card for PC
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software	Microtek Scanwizard f. Win as bundle: Impos/2 for OS/2
options	back lighting attachment TMA-II autom. dokument feeder ADF 600

ScanMaker E6

optical resolution	600 x 1200 dpi
max. resolution (interp.)	4800 x 4800 dpi
max. artwork size	216 x 330 mm
colour depth	30 bit (1,07 milliard colours) 10 bit (1024 greyscale) 1 bit (black and white)
scan mode	single-pass scanning method with rapid colour CCD
interface	Adaptec 1502E-ISA card for PC
system requirements	386 CPU or better Win 3.x, Win 95, OS/2
software	Microtek Scanwizard f. Win as bundle: Impos/2 for OS/2
options	back lighting attachment TMA-II autom. dokument feeder ADF 600

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scan mode	single-pass scanning method with rapid colour CCD
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Exploiting the DOS/Windows Session

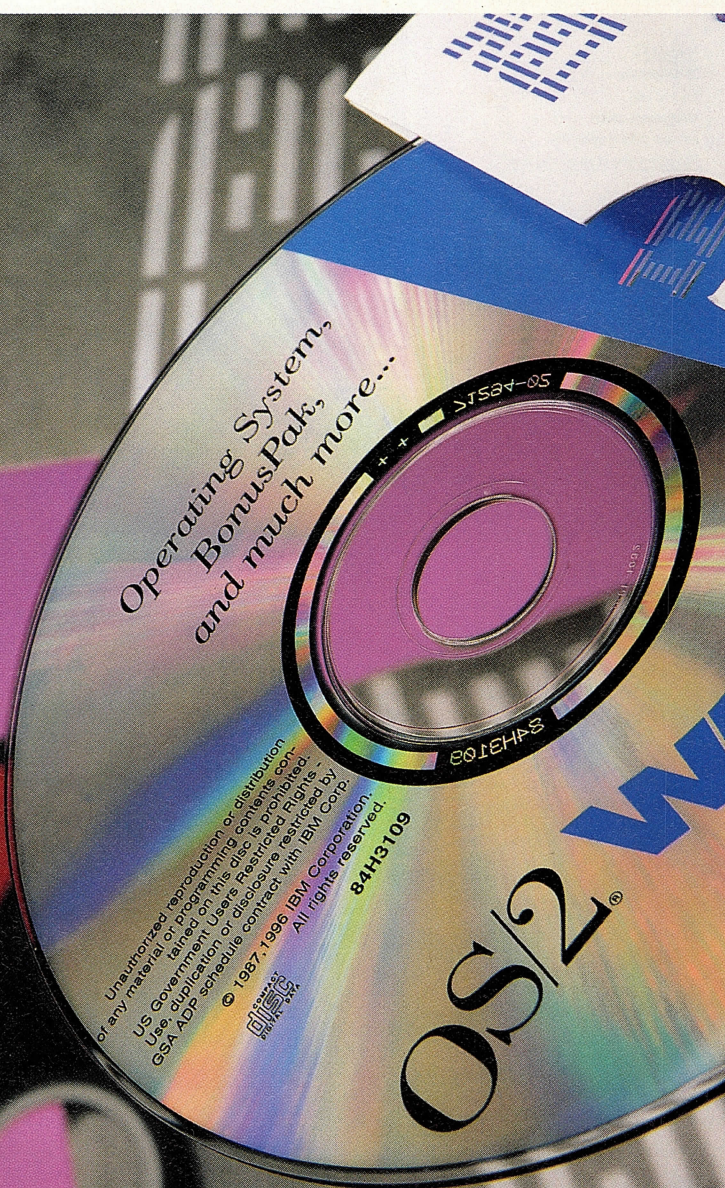
All about OS/2

Warp 4.0's

trapdoor

functionality.

By Chris Perritt



OS/2 Warp 4.0's Dedicated DOS/Windows Session provides an enhanced way of performing the Dual Boot function to run DOS and Windows programs. You can start this session from icons on the Workplace Shell (WPS) desktop. When you run a DOS or Windows program in this environment, OS/2 is not shut down as it is when you use Dual Boot. Instead, OS/2 hibernates to disk and is resumed after you complete the dedicated session activities.

This function isn't entirely new. Some OS/2 Warp 3.0 preloads supported a "trapdoor" feature for DOS and Windows games that would not run in the Win/OS2 environment. With OS/2 Warp 4.0, this functionality is offered to all OS/2 users and expanded to handle DOS and Windows applications. Program templates now have a modified Properties notebook for Trapdoor Session Type, and *migrate.exe* checks the application type to set up the proper session type.

Where's the benefit?

Of course, we'd prefer to run DOS/Windows applications right on the OS/2 desktop, either in a Win-OS/2 session or in a Virtual DOS Machine (VDM) window. However, VDM sessions are often incapable of virtualizing the large number of interrupts required to run certain games and maintain the same look and feel of a native DOS environment. Also, exclusive device ownership and other similar actions cannot be permitted in a protected, multi-tasking environment such as OS/2.

When it comes to running games or other problematic applications, the common solution has been to use OS/2's standard Dual Boot feature to enter a DOS environment. This action involves shutting down OS/2, booting DOS, running the application, and then re-booting OS/2, and isn't a good solution, either, because it's often time consuming.

Using a hibernate/resume operation as a Trapdoor to a dedicated DOS/Windows environment is the solution provided in OS/2 Warp 4.0. This type of operation provides a native DOS/Windows application environment,

while preserving the OS/2 environment in a suspended state, thereby permitting the application to do whatever it needs to do without causing interference with the OS/2 environment.

How it works

Trapdoor is an enhanced method of performing the Dual Boot operation to load and execute specific DOS and Windows applications. Trapdoor applications are started from desktop icons just like any other application (Figure 1).

When you launch a Trapdoor application, the OS/2 environment is hibernated to disk. A DOS/Windows environment (with a specific *config.sys* for each application, if necessary) is loaded, and the application is started. If the application is a Windows application, the actual Windows code is loaded, and the application is launched in place of the Windows Program Manager. When the application exits, the DOS kernel calls the OS/2 loader to restore the OS/2 desktop.

When a Trapdoor icon is selected, you are informed that the program uses a special session that suspends other applications. Any communications session will have to be restarted after running the application. If your hard disk has insufficient space to create the hibernation file, you are informed that the Trapdoor request has failed. (The hibernation file can consume an amount of disk space equal to the size of real memory. Only the physical memory pages actually in use are written to the hibernation file. The hibernation file space is dynamically allocated and deallocated. It does not exist during OS/2 operation, but the space must be allocatable to enter the Trapdoor environment.)

The Migrate utility is used to set up a previously installed application to operate in the Trapdoor environment. The WPS program template lets you create a program object for Trapdoor applications that do not exist in the migration database.

Hibernate/restore operation

Hibernation captures the state of the OS/2 system and of the hardware and quickly saves it to disk, allowing the system to be rebooted or powered off. When the system is booted or powered on, the OS/2 loader recognizes that the system was hibernated and quickly restores OS/2 to its previous state.

With hibernation, the process of running a dedicated DOS/Windows session is simply a matter of clicking on a desktop icon, running the application in a dedicated DOS/Windows environment, and returning to OS/2

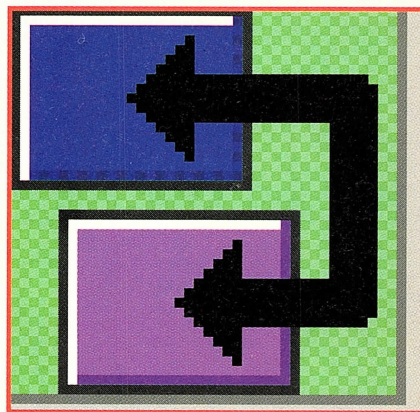
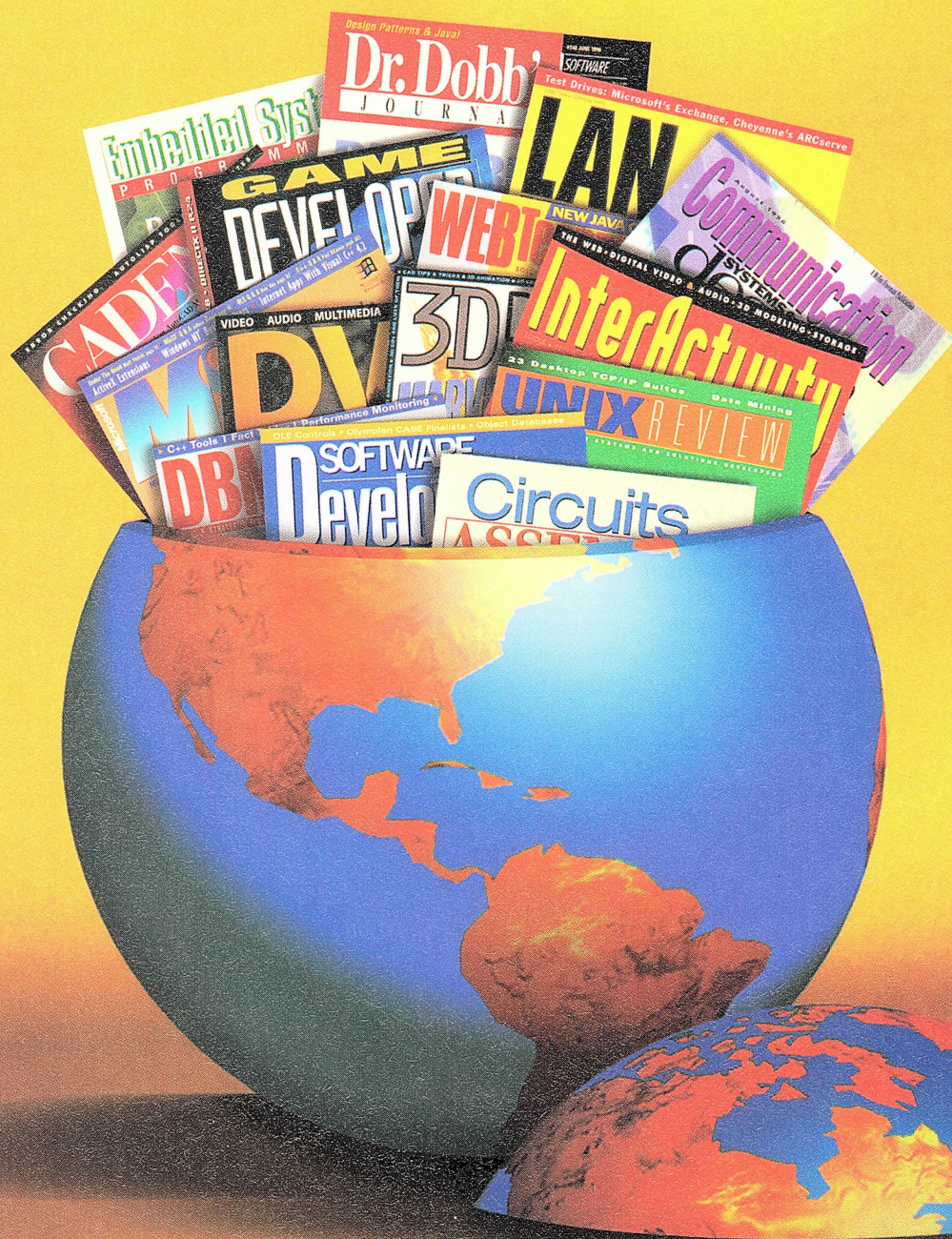


Figure 1: Workplace Shell icon for DOS mode.

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when the application is complete. Of course, the multitasking capabilities of OS/2 are suspended during this operation.

The hibernation program evaluates the current state of the system, determining whether hibernation is feasible, and displays appropriate messages for error conditions, such as insufficient hard-disk space. It then acquires the disk space for the hibernation file, sends out suspend notifications to device drivers, and stops scheduling of threads. Finally, it flushes the file system buffer and cache and directs the writing of the hibernation file to the hard disk.

When the Trapdoor application exits, the DOS kernel loads the OS/2 Master Boot Record and executes it. The OS/2 boot loader detects that the system has been in hibernation and loads the Resume program. The Resume program restores the OS/2 memory image, then resumes scheduling of threads, sends resume messages to device drivers to restore device states, frees the disk space used by the hibernate file, and refreshes the FAT image in memory from the FAT on disk.

Installing Trapdoor applications

Trapdoor applications should be installed in a standard Dual Boot environment. In doing so, you'll be able to verify that the application works correctly in its native environment and to modify the DOS *config.sys* if necessary, without interfering with the OS/2 *config.sys*. The applications can then be migrated using Add Programs in the System Setup folder.

Trapdoor applications must be installed on a FAT disk partition, since HPFS partitions are not accessible from ordinary DOS/Windows. Remember, when executing in the Trapdoor environment, you're running the application in its native environment.

By default, the FAT disk partition must also be located on an IDE disk drive. The OS/2 installation program checks for it and will not install the Trapdoor feature if your system is not configured properly with an IDE drive. Why? The hibernate/resume logic uses the generic INT 13 BIOS interface to perform its functions. This logic works with many SCSI disk de-

vices. However, some SCSI device drivers put the disk/adaptor in such a state that it cannot be accessed through the INT 13 interface, preventing the hibernate logic from working correctly. If you wish to install the Trapdoor feature on your SCSI disk, insert the command

```
SET TRUEMODE=1
```

in *config.sys* after the first phase of installation is complete.

When the first phase of installation is complete, you are instructed to reboot the system. Press <F3> at this

Working with Windows 95

Although Windows 95 is not directly supported by the Dedicated DOS/Windows Session, you can set up your system so that it behaves as if it was [directly supported].

Install OS/2 and Windows 95 in the same partition using Dual Boot. You can make sure everything is working properly first using Dual Boot. Then, create an OS/2 full-screen program object. Set the path name to a command file such as *win95.cmd*:

```
/* Set up "Trapdoor" for Windows 95 */ "boot /dos /noboot.1
/quiet"
"hybernate -r" exit
```

Click on the object, and OS/2 will hibernate itself and boot up Windows 95. When you return from Windows 95, OS/2 will quickly restore the system to the state in which you left it.

On your Windows 95 desktop, create a shortcut to *\os2\boot.com /os2 /quiet*. Use the Advanced Program Settings pushbutton to execute the program in DOS mode. Turn off the Warning Message checkbox and select the checkbox to use the current DOS configuration. This selection will return you to OS/2 as seamlessly as possible.

IBM's Just Add Warp utility for converting Windows 95 long file names to OS/2 8.3 names with extended attributes is the means for migrating long file names from Windows 95. Windows 95 can be installed without the long file name support, or you can run the utility as desired.

Installing OS/2 over Windows 95. When installing OS/2 on a system that already has Windows 95, be careful about automatically migrating programs to the Workplace Shell (WPS) desktop. While OS/2 can run Win32S applications, it can't currently run Windows 95 programs. Messages such as "DOS Error 23" and "You need a new version of WIN-OS2" mean you're trying to run a Windows 95 application that currently does not run under OS/2. When installing OS/2, instead of migrating all applications automatically to your OS/2 WPS desktop, choose the Select New Programs option. This option allows you to select/deselect which programs to add. Avoid any applications in the *\program* and the *\windows* directory (if that's where you installed Windows 95).

Installing Windows 95 over OS/2. If your system already has DOS, Windows 3.1, and OS/2 Warp installed in a single disk partition, you can dual boot to DOS, load Windows, and run the Windows 95 setup program. Do not install Windows 95 into the *\windows* directory, or you'll disable OS/2 Warp's capability to run Windows 3.1 applications (Windows 95 overwrites Windows 3.1 programs to reuse disk space). Install Windows 95 into a separate directory.

After Windows 95 is installed, it won't allow OS/2's dual boot *boot.com* program to run. Your choices for switching from Windows 95 to OS/2 are either to restart Windows 95 into MS-DOS mode and then run *\os2\boot /os2*, or to create a PIF file to run *boot.com /os2*, selecting the Advanced setting of MS-DOS mode.

point to go to a command line and edit *config.sys*. (This feature will work on many SCSI systems, but it is not an IBM-supported feature.)

If you want to Trapdoor to Windows applications, you must have already installed a copy of Windows.

Migration issues

When you're installing OS/2, Windows 3.1 and Win32s applications will normally be migrated to work within a Win-OS/2 session. Applications that won't work under Win-OS/2 will be migrated to use the Trapdoor environment.

Hibernate Instead of Shutdown

The OS/2 hibernation feature is an integral part of the Dedicated DOS/Windows session support. If you don't need to access the dedicated session, you can still take advantage of the hibernation function for a fast suspend/resume operation.

The hibernation function can be made available as an icon on the desktop or as a button on the WarpCenter (Figure 2). Users can hibernate OS/2 prior to power off and resume automatically on power up rather than performing shutdown and rebooting.

To invoke the hibernate function, create an OS/2 full-screen program object that points to `\os2\system\hybernate.exe`. When this program is launched, it will display a message that indicates whether the hibernation was successful and when it is safe to power off your machine.

The need to reboot OS/2 is removed for almost all users by offering OS/2 Hibernation/Resume as an alternative to booting the system when powering up. Restoring OS/2 from a hibernated state takes approximately 15 seconds as opposed to several minutes when booting the system.

Some device drivers may not be enabled for the suspend/resume operation and will not work properly when the system is powered on after the Hibernation. Unfortunately, you may still need to reboot your system to recover these devices adapters.

If you're using a laptop or notebook system, ejecting a PC Card (PCMCIA card) before hibernating and then inserting it after the Resume will help preserve the correct operation of the adapter.



Figure 2: Workplace Shell icon for hibernation.

A new **SESSION_MODE** is provided in the migration database for Trapdoor applications. Called **DOS_MODE**, it emphasizes that it is an environment for special DOS/Windows applications. For example, here's how a popular game looks in the migration database:

```
REM -----
REM Aces of the Pacific by J
  Dynamix REM
-----
NAME ACES.COM
TITLE Aces of the Pacific
TYPE DOS
ASSOC_FILE NULL
ICON_FILE WAR.ICO
DEF_DIR \ACES
SESSION_MODE DOS_MODE
```

You can create a Trapdoor icon when the application is not in the migration database. A Program template is provided, which allows you to fill in the necessary parameters to launch the application in the Trapdoor environment. You can also change the session type for an existing program object, such as from Win-OS/2 to the Trapdoor session type.

The Properties notebook for these program objects contains modifications to the following pages:

- **Program** provides the name of the application and its working directory.
- **Session** allows selection of session type, including the new Trapdoor type. DOS Settings is not selectable for this session type.
- **Icon** allows selection of icon and title for the program object.

Trapdoor is installed in a dual-boot partition. This mechanism is used to switch back and forth between the OS/2 and Trapdoor environments. Boot Manager is a superset of this function. If Boot Manager is enabled, it will prompt you to select which operating system to boot, such as OS/2 Warp 4.0, another operating system, or a version of OS/2 that does not support Trapdoor.

When the original OS/2 partition that supports Trapdoor is selected, it will resume its normal Dual Boot operation.

When you're running Windows 3.1 applications in a Trapdoor session, those applications are launched

with a replacement *system.ini*. The original Windows *system.ini* file is saved in `\os2\system`. The file is then modified so that the original **SHELL=PROGMAN.EXE** is replaced with **SHELL=appname.EXE**. After OS/2 is restored, the original *system.ini* file is immediately replaced and the backup copy in `\os2\system` is erased, indicating a successful completion of the application initialization. (If the OS/2 loader program finds that the Windows *system.ini* file still resides in `\os2\system`, it was not restored properly.) The loader program then copies the *system.ini* file to the `\windows` directory.

Hibernation tips

Before you perform hibernation or launch a Trapdoor session, save your data files. When you are working with applications that create files or modify data on the hard disk, it's very important to use the File/Save commands built into the application to save your work often. Although Hibernation remembers the state of your computer and all open files, it does not save your open files or data files to the hard disk.

If you're running host communications, Trapdoor breaks the link to the online service or "host" computer, and, typically, the link can't be automatically restored. Most communication programs will detect a communications error and notify you when you return to OS/2. You should exit the communications program and restart it after using Trapdoor.

What about your network? You should log off before you use Trapdoor. When you return to OS/2, log on to the network again. This action helps to reduce confusion to the network server and increases computer security. Some network connections cannot be restored without rebooting OS/2.

OS/2

Chris Perritt is a member of IBM's OS/2 Architecture and Design team and has been a part of the OS/2 development team since 1986. He can be reached at cperritt@austin.ibm.com.



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Learning Merlin with WarpGuide

IBM tackles OS/2 Warp 4.0 training and ease of use. By David P. Both

IBM's latest version of OS/2, code-named Merlin and officially called OS/2 Warp 4.0, has two important features that are instrumental in making the operating system easier to learn and use than its predecessors. One of these new features, the WarpGuide, is brand new; the other is an enhanced online tutorial. Taken together, these two features can make life easier for anyone who needs to learn—or teach—OS/2 Warp 4.0.

Everything actually starts at the Assistance Center, a new top-level folder that contains the old Information folder, many of the online books and .readme files, and the WarpGuide and tutorial.

WarpGuide

WarpGuide is a single intelligent entity within OS/2 Warp 4.0 that is designed to facilitate your interaction with the user interface. One key component is a set of informative Cue Cards that appear on certain infobox pages. These Cue Cards provide guidance and explanations for specific fields on selected pages of the infobox. The other component is the "Guides," analogous to Windows 95's Wizards. Guides are alternative, simplified methods for performing

some common tasks, such as adding a printer, adding a program object, customizing the system, or finding objects on the hard disk.

WarpGuide can provide guidance for users with different levels of expertise. A new user can register with WarpGuide using the "User Check-in for WarpGuide" Guide. By registering the names of multiple users and specifying the level of experience each has, WarpGuide can provide customized assistance to different users of the same machine. It is only necessary to tell OS/2 which user is currently using the system.

Figure 1 shows the User Check-In for WarpGuide. Notice the Cue Card displayed above the top of the window, the outline around the area of the window with which the user is currently working, and the shading over the rest of the window. These three elements of WarpGuide are used to focus the user's attention on the specific area of the window for which guidance is provided.

The Cue Cards

WarpGuide's Cue Cards provide brief advice and guidance for OS/2 users attempting to perform some selected common tasks. They are *not* designed to provide more in-depth information, which is available by pressing <F1> or clicking on the Help button.

IBM refers to WarpGuide as an intelligent agent, meaning that it keeps a database of the user's interactions with a task and changes the presented guidance to novice, intermediate, advanced, or expert level accordingly.

An overview portion of the Cue Cards contains additional information that is particularly useful to a novice user. The overview usually provides a more detailed description of the task to be performed, along with some additional information about how to perform it. Click on the Information icon on the Cue Card to get a pop-up menu that allows you to turn on the overview or manually override the user experience level.

Compare the information on loading mouse pointers on the Cue Card in Figure 2 to the overview information

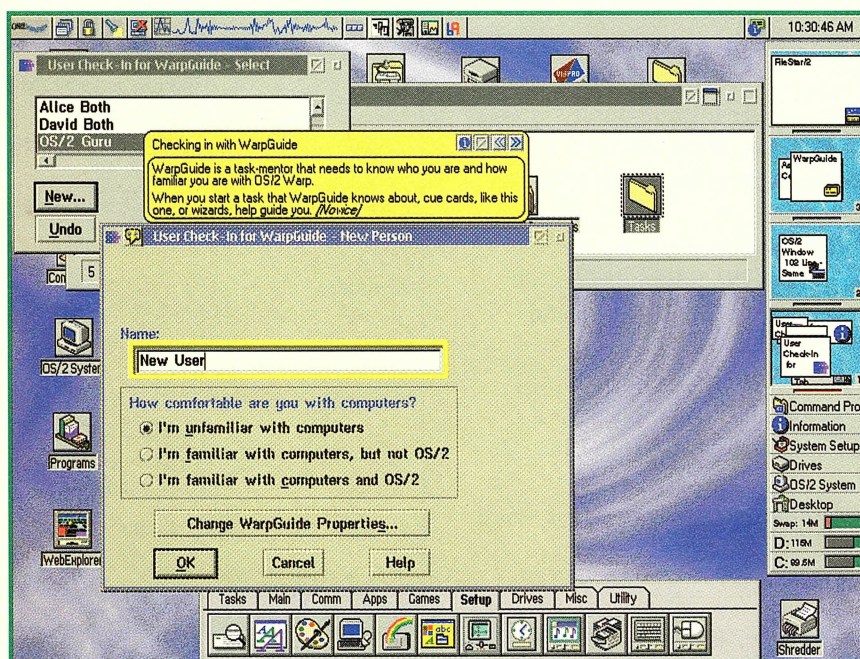


Figure 1: WarpGuide's User Check-in.

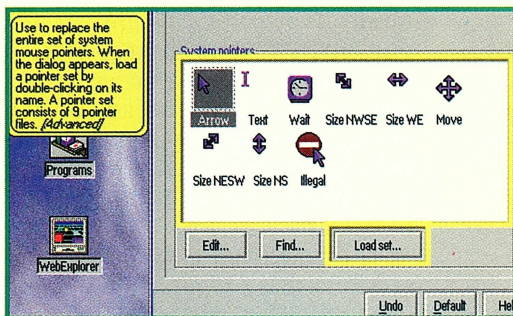


Figure 2: Advanced level Cue Card for mouse setup.

for the same task displayed by the Cue Card in Figure 3. The additional information in the overview describes everything you can do to customize the mouse. The task-specific information covers the selection of pointers. Notice the difference between the intermediate text in Figure 3 and the advanced text in Figure 2. In addition, the advanced mode doesn't display shading—only outlines remain, helping the user focus on the portion of the window referred to by the Cue Card text.

WarpGuide Cue Cards are designed to focus the user's attention. The Cards are useful for users who have had some training on OS/2 but need some coaching to enable them to properly complete the tasks. Cue Cards provide overt guidance to users needing it and automatically become less obtrusive as the user gains experience. They can be used to reinforce whatever training a user has had.

The "Guidance on..." tools

WarpGuide "Guidance on..." tools—I call them Guides—provide new users with easy, alternative methods for performing common tasks. They are especially useful when a user has little or no training on the tasks that the Guides cover. These Guides can be used instead of OS/2 Warp 4.0's properties infoboxes (which replace the OS/2 Warp 3.x Settings notebooks) to perform tasks such as adding a printer object. (More experienced users can still use the properties infoboxes directly.)

How do you get to the Guides? Activate the WarpCenter, click on the Assistance Center icon, and open the WarpGuide folder. Then click on the specific Guide for the task you want to perform. You can also open the Assistance Center folder on the desktop, then open the WarpGuide folder, and select the Guide you want (Figure 4).

To obtain guidance on adding a printer, click on the Guide of that

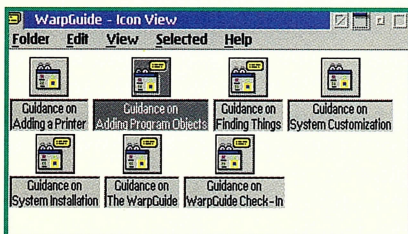


Figure 4: WarpGuide folder.

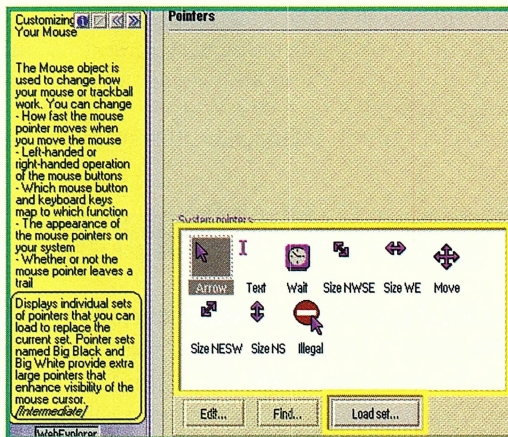


Figure 3: Intermediate level Cue Card with overview.

form, rather than making them guess at items in a notebook. Very explicit instructions accompany each subtask to help avoid any confusion.

Figure 6 shows the dialog box for choosing a printer. This task is simplified for new users who have a printer that is unsupported by IBM. Clicking on the "I have a disk" button leads to a dialog that lets the user specify the location of the disk containing the driver. The printer driver is then installed from the selected disk.

The Guides offer inexperienced users an alternative to the more complex properties infoboxes, providing a way for those without a great deal of training or knowledge to configure some aspects of OS/2. This capability can be a double-edged sword, however, because some IS managers won't want their users to make configuration changes to the operating system. Those IS managers may want to delete the existing Guides so their users don't have access to anything that can alter the system configuration in any way.

The biggest failing of WarpGuide—at least in the Merlin beta—is that none of the Guides or Cue Cards help with OS/2's networking and connectivity setup. Because OS/2 Warp 4.0's powerful networking features are big selling points, the lack of WarpGuide support for them is a significant weakness.

IBM's WarpGuide development team is creating a toolkit—to be shipped in a future release of the Developer Connection CD-ROM—that will allow application developers to create Guides and Cue Cards for their own applications.

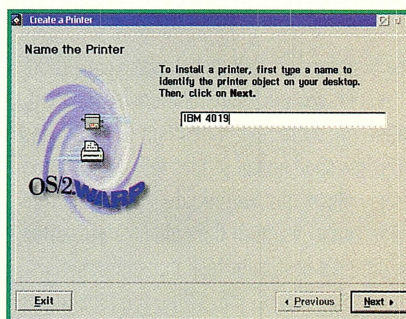


Figure 5: Creating a printer object is broken down into discrete subtasks.

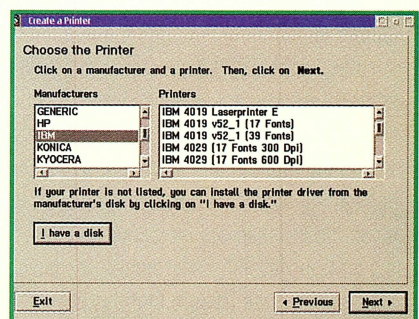


Figure 6: Choosing the printer is easy with this panel.

The new tutorial

Did you run the tutorial included with OS/2 Warp 3.0? According to IBM, about one-third of all OS/2 users have tried the tutorial. If that number is correct, it's just far too

small! A tutorial should be the first place for new users to explore a new operating system and its unique features and to practice basic operations.

OS/2 Warp 4.0's tutorial was not included in the beta because it wasn't

ready. However, while I was in Austin, Tex., participating in an IBM task analysis group to help develop the Merlin certification test, I was able to work with the unfinished products. (My thanks to IBM's Laura Adams, who facilitated my access to the tutorial, and to Jill Timm, the new tutorial's creator.)

The new tutorial has four main sections: Base Operating System, Connect, VoiceType, and Help. Each of these sections is fairly short and easy to complete in a reasonable amount of time—well under an hour in each case. The Help section is the shortest and should only take five to ten minutes.

When I sat down at the Test PC tutorial, I registered as a new user, but did not train the VoiceType system to recognize my voice patterns. With the exception of a few command words that had not yet been incorporated into VoiceType, I was able to successfully navigate the tutorial using voice commands alone, including the practice exercises. I was even able to use voice commands to navigate when a bug caused the main menu buttons to disappear, disabling mouse and keyboard navigation. Ms. Timm assured me that the command words will be added and the bug will be fixed by the time Warp 4.0 ships.

One powerful feature is the tutorial's ability to provide a real desktop on which users can practice the activities that they have been learning. The beauty of this feature for new users is that they can use the same methods for navigating the tutorial as they can for practice and normal usage, whether that method is keyboard, mouse, voice, or any combination of methods. As a result, navigation is consistent between the learning environment and the real work environment.

A course of study

As a consultant, I generate proposals that include training for end users as part of the consulting package. When the time comes for training, however, the users can't spare the time to go to a class. Ten or twenty minutes of so-called instruction by the machine's previous user is not training; neither is grabbing a few

The Intelligence Behind WarpGuide

WarpGuide represents a new way of coaching the user through tasks. While in Austin a few weeks ago, I was fortunate enough to talk to the WarpGuide project leader, Les Wilson.

The idea for WarpGuide can be traced to an article about IBM's research at its Almaden facility. The article, entitled "Coach: A Teaching Agent that Works," appeared in the July 1994 issue of *Communications of the ACM* (Association for Computing Machinery). Using this article as a starting point, Wilson and a team of researchers, developers, and psychologists created an intelligent agent that is able to adapt to individual usage patterns and respond with appropriate guidance.

Mr. Wilson and his colleagues recognized that the design of current user interfaces reflects the way the designers of those interfaces think, rather than how the users of interfaces think. To determine the level of guidance provided on the Cue Cards, WarpGuide uses a lightweight artificial-intelligence (AI) engine that contains an internal model of how a user views and reacts to the interface. The AI considers factors such as the number of times the user has accessed a given element of the interface, the length of time between the accesses, and the amount of time spent on each element. This information is stored and used to make a judgment regarding the user's familiarity with the task or element grouping. WarpGuide then guides the user through the correct sequence of subtasks required to complete a task, such as creation of a printer object. "If the user chooses not to follow the usual path [through the task]," Mr. Wilson said, "WarpGuide adapts to follow the new sequence chosen by the user." For example, when creating a printer object, users don't usually print to a file. When a user chooses this direction, however, WarpGuide alters the guidance provided to direct the user to complete the task properly despite the change.

An intelligent agent like WarpGuide, Mr. Wilson continues, "allows the user to explore the user interface and get information regarding what it is, what to do, and what can be done with a specific element of the interface." Through such exploration, the user gains knowledge of and experience with the interface.

WarpGuide is activated when the user does something that the system recognizes. Using basic communication theory, WarpGuide sends information in the form of Cue Cards to the user through the channel of the interface. WarpGuide measures the user's response and stores that information so as to determine the user's experience level the next time he or she performs the same task.

According to Mr. Wilson, "The trend is to move information presentation from the traditional interfaces to in-your-face, proactive behavior. This is a step above field-level help and is the next step in user interface help development, because it works with the user's perception of what is happening."

Another indication of the level of sophistication in the WarpGuide is that its behavior changes are not discrete steps. For example, when the AI determines that you are ready for more information, but aren't out of the novice level, it will present the intermediate text in addition to the novice text. As the user demonstrates more experience, it stops the shading but retains the Cue Card and highlighting border. At the advanced level, the AI simply places the WarpGuide icon on the title bar so the user can call on it when needed. WarpGuide can also return the guidance presented to a previous level if, for example, you have not performed a particular task in a long time.

Mr. Wilson is well aware that this is only the beginning for WarpGuide. While the function of WarpGuide is complete, he would like to see WarpGuide become aware of more tasks.

minutes from a busy IS person. Users are often shown, not taught, the key-strokes or mouse input required to perform specific job tasks. They are seldom trained on the basic tasks of the environment in which they work.

A training course has specific objectives that must be met and must be measurable. When a user can perform the tasks required to meet the objectives of the course, the user can be considered trained.

OS/2 Warp 4.0's tutorial has been designed with a specific set of educational objectives in mind. It will train a beginner to use the OS/2 user interface, the voice recognition capabilities, the basic network functions (such as logging on and using network directories and printers), and the online help.

WarpGuide is a complex, sophisticated adjunct to the tutorial, the online OS/2 help, and the documentation. With WarpGuide, IS managers have at hand a pair of top-notch training tools within OS/2

Warp itself. Users will typically take two to four hours to complete the tutorial, depending on their initial level of knowledge and skill and the speed at which they learn. Add to the tutorial WarpGuide's ability to simplify some common tasks and provide online, real-time assistance, and you have an unbeatable combination for organizations needing to improve OS/2 Warp skills. Those IS professionals with training responsibilities would do well to use these tools, which are readily available and free.

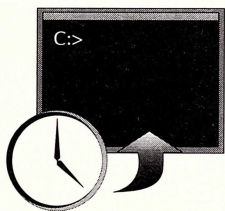
Users should complete the tutorial; it only takes a short time. Trainees should be encouraged to use the tutorial's Practice facility to ensure that they can actually perform the tasks about which they are reading. Ideally, they should be given an environment in which they will be uninterrupted by their daily jobs, such as a classroom setting. However, if classroom facilities, instructors, and an IS department are lacking, four relatively short sessions with the tutorial

at his or her desk should take the new user through all four sections.

All things considered, the changes that IBM has made to ease learning and using OS/2 Warp are a giant step in the right direction. IS managers and trainers should be very happy with these aspects of OS/2 Warp 4.0. **OS/2**

David Both is president of Millennium Technology Inc., a consulting firm based in Raleigh, N.C., that specializes in OS/2 Warp products. He has 21 years previous experience with IBM Corp., most recently as the lead OS/2 support person for the IBM Personal Computer Co. He is an IBM-certified OS/2 engineer charter member and an instructor for OS/2 Warp, OS/2 Warp Connect, and OS/2 Warp Server. He is also co-author of the book Inside OS/2 Warp, from New Riders Publishing. David can be reached at dboth@ibm.net.

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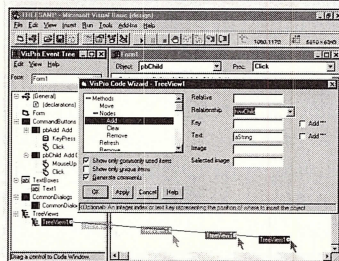


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OpenDoc Support in VisualAge for Basic

Compound documents in Basic style. **By Daniel House**

If you've been following OS/2 software development topics, you've probably heard about a rapid application development tool code-named Bart. Well, it's here, as VisualAge for Basic for OS/2 (and Windows). It supports scripting of built-in and add-on visual and non-visual components using the Basic language; building database-stored procedures and user-defined functions with built-in Basic language extensions for SQL; scripting System Object Model (SOM) classes, OLE objects and OCXes (Microsoft custom controls); and exploiting OpenDoc compound documents. However, that's a lot of stuff to describe. In this article, we'll focus on OpenDoc and how VisualAge for Basic supports OpenDoc under OS/2.

OpenDoc uses a slightly different approach to computing than did application models of the past. OpenDoc is an architecture for compound documents, which are collections of components that can be built up dynamically. Imagine the compound eye of a bee. It functions as a unit, but it is made up of many independently functioning components. An OpenDoc compound document functions as a unit, but it, too, is made up of many independently functioning components.

Unlike the compound eye, the OpenDoc components in a compound document can perform different functions and can communicate with each other. Also, OpenDoc components can be added, deleted, and modified at any time. Don't try these things with compound eyes.

OpenDoc basics

At this point, an ounce of terminology will prevent a pound of confusion later.

A compound document is a stateful application composed of reusable parts; sometimes, it is just referred to as an application or as a document. However, these are loose associations, because applications are generally only stateful, using external databases or files, and documents, likewise, evoke an older model of a flat file structure.

OpenDoc describes the component architecture and a library of run-time code used to implement it. An OpenDoc Part is an instance of an object described by an OpenDoc part editor—also called a component, component part, or just a part. The OpenDoc Part Handler, loosely speaking, is

a class, and an OpenDoc Part is an instance of it. If an OpenDoc Part is a bee's eye, then the Part Handler is the DNA that describes it and that can construct it when needed.

For example, a user may place an OpenDoc component (Part) into another OpenDoc component to create a new compound document. This compound document might be a Text Part inserted into a 2D Graphics Part, for example, to create an engineering schematic (2D Graphics Part) with annotations (Text Part). Although the resulting compound document may contain many parts, it is still a single entity and can be represented by a file. This file functions as a miniature file system wrapped into one operating system file.

"Launching" an OpenDoc file by opening it under the OpenDoc document shell brings to life all of the parts contained in the compound document. The document shell, however, doesn't know anything about the specifics of each of the parts within the document. It does know some of the APIs that each of the part editors must support in order to "play well" in the OpenDoc compound document architecture.

The document shell is thus a traffic cop, helping to implement the rules of the OpenDoc road. It coordinates activities among the parts, but it involves itself in activities that relate to the document as a whole instead of an individual component. It's sort of like the brain behind the compound eye. The document shell facilitates communication among the parts, tells them when to Save and Restore state, and helps manage a common menu and activation scheme so that the individual components are coordinated for a larger purpose.

OpenDoc's "different" approach is twofold. First, the application (compound document) is being constructed from reusable parts. Second, it remembers its state without using external databases or side files.



Figure 1: OpenDoc document with image part and image.

OpenDoc

Getting a program to remember its state is done all the time. It might, for example, read state data from a database, such as DB2. Usually a program doesn't modify itself to save state—it would be considered very bad form indeed. OpenDoc compound documents, however, exist as a collaboration of independent stateful entities. The compound document itself has state; for example, the visual positions of the parts. The parts themselves also have state; for example, the text contained in a text part contained in the compound document.

Building applications from reusable parts is the real honey. OpenDoc's architecture defines a set of rules by which parts play well together. Once a Part Handler is written using OpenDoc's APIs, parts of that type will be reusable in a variety of different applications. VisualAge for Basic is one way to develop those applications.

VisualAge for Basic constructs applications visually and through programming. Visual controls can be placed in applications with drag and drop. Program code, written in the Basic language, is optionally attached to the visual controls or to the forms (the windows).

The process of developing an application is done in "design mode." The project window, visual control toolbox, code editor, and properties editor are used to construct forms and the code behind them. During construction, the project can be put in "run mode" to test the application. In run mode, the application behaves as a stand-alone program that a user would see, except that the project window is usually still visible (it contains the menu option to go back to design mode).

A sample application

We've covered a lot of ground here. So, to make things a

little more concrete, let's build an example application and enhance it with OpenDoc compound documents. Mercifully, this example has nothing to do with eyes, bees, brains, or traffic cops. Our application is being built for Eddie's Dog Kennel. A CD-ROM with the application will be distributed to Eddie's potential clients as a direct mailing sales technique. The potential clients will run the program from disc and be so impressed that they will contact Eddie immediately.

The program will consist of an application that uses (links to) several OpenDoc compound documents. In reality, the process would be a bit more complicated.

OpenDoc and the specific OpenDoc part editors used in the application will not necessarily exist on the user's computer when the disc is run. For the OpenDoc run time, instructions for downloading would simply point to IBM's Club OpenDoc on the World Wide Web. Other required software, including OpenDoc part editors, could also be packaged on Eddie's Dog Kennel CD-ROM, or instructions included for downloading or ordering them. We will ignore these complications for the sample application.

Our application will be an interactive demonstration of the facilities and services that the kennel has to offer. Using VisualAge for Basic as an iterative development tool, we will construct the kennel application from a toolbox of visual parts, as well as from some OpenDoc compound documents. We could also use SOM classes, C++ classes, Basic language classes, custom controls, OLE, and OCX objects (depending on the operating-system platform), but we will keep it simple for this example.

First, we construct some OpenDoc compound documents that have information or features that we think kennel clients may find of interest. For now, we will stick to

simple things we can construct with the OpenDoc multimedia parts on OS/2: pictures, videos, and sound clips. For example, we will use pictures of the kennel's champion-sired puppies in an OpenDoc compound document with an OpenDoc Image part. Figure 1 shows an OpenDoc document shell with a container part as the "root," or first part in the document. Inside the container part is an OpenDoc multimedia image viewer part, with an image inside it. This document exists as a Bento-format file, *pups.od*. (Bento is OpenDoc's way to implement a database that stores an object's persistent data.) Other OpenDoc documents will be used as well: one with a video clip tour of the facilities and another with just an audio clip welcome message. They are all constructed by following the directions for each of the OpenDoc part editors we intend to use: video, audio, and image.

Figure 2 shows the end result of constructing the Eddie's Dog Kennel disc. It



Figure 2: Eddie's Dog Kennel application being constructed.

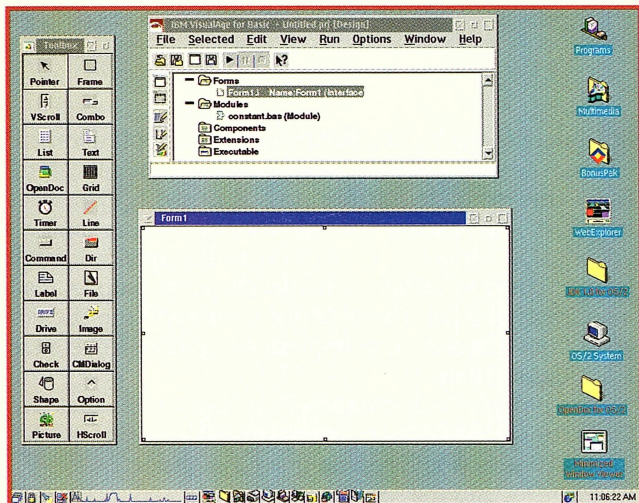


Figure 3: VisualAge for Basic in design mode.

shows the application in design mode. In run mode, you would only see the form, which we have captioned "Welcome to Eddies," and the project control window. After making an executable and packaging the application on a CD-ROM, a user would see only the form. Users do not see the design mode or even the run

mode. They see only the application represented by one or more forms.

Each of the images displayed in Figure 2 is, in fact, an OpenDoc compound document, albeit a simple one. These particular images (OpenDoc controls) have no code behind them. That is, we have not written any logic to execute when the user clicks on

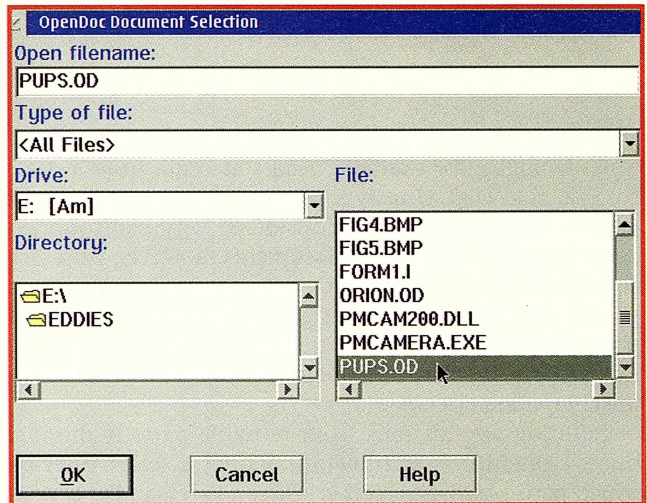


Figure 4: Choosing an OpenDoc compound document to link.

them. However, unless we disable the OpenDoc Image part editors by setting the appropriate properties in the property editor, users can launch it by double-clicking on the images, which is a default behavior for OpenDoc controls. Later, we will see why Eddie wants this behavior.

The video and audio buttons in Figure 2 do have program logic behind them, in the form of Basic code. When clicked, they open the OpenDoc compound documents that contain the video and audio player parts. Let's see how this was accomplished.

Behind the scenes

To create this application, we drag and drop GUI controls from the toolbox onto a form or blank window. Once the controls are placed as we want them and any desired code is written, an executable is generated. We begin this process by starting VisualAge for Basic. An initial form, project window, and control toolbox appear, constituting the initial design mode session (Figure 3).

To place text on the form, click on the text control and drop it on the form. The text in the control is entered with a properties editor, brought up from a menu option or shortcut. The Command buttons are placed on the form in a similar manner.

Next, the links to OpenDoc compound documents are placed on the form. The OpenDoc container control is selected and positioned on the form. Once on the form, a dialog box appears (Figure 4). A specific Open-

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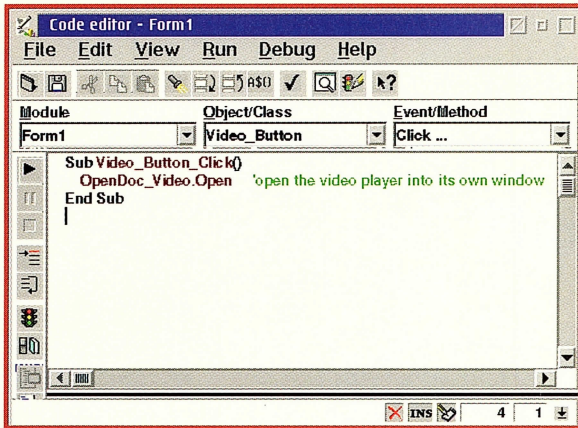


Figure 5: Writing Basic code in the Code Editor.

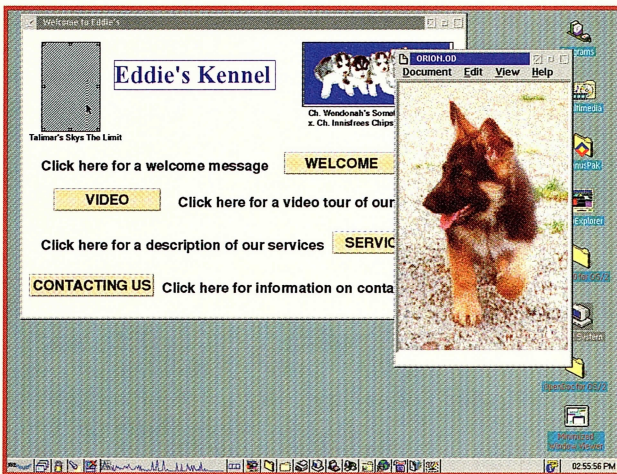


Figure 6: Sample application with an OpenDoc document opened into a separate window.

Doc compound document is selected by choosing its file name. In Figure 4, the *pups.od* document is being selected for linking.

The links to the OpenDoc compound documents with video and audio clips are constructed in a similar fashion, except that the OpenDoc container controls are made invisible by setting the visible property in the property editor. That is, the buttons shown on the form in Figure 2 are not OpenDoc container controls. Rather, they are VisualAge for Basic command button controls.

To cause the OpenDoc video or audio players to become visible when a user chooses, these buttons have Basic code behind them. When the user clicks the button, the Basic code behind the button causes the invisible (video or audio) OpenDoc compound document to be launched into a separate window where the video,

for example, can be played. The sample Basic click-event code to make this happen is very simple (Figure 5).

The click-event code in Figure 5 is produced in the integrated development environment of VisualAge for Basic. You can launch the code editor simply by double-clicking on one of the Command button controls on the form being constructed during design mode. A pulldown list that's inside the code editor shows the available event procedures that can be used. Next, choose "Click-event," and you'll see the Basic code shell for that event in another window. Type it in (as in Figure 5) and close the window. The name **OpenDoc_Video** is the name we gave the control, which is invisible, containing the video player.

Video_Button is the name we gave the Command button control that will be clicked to open the video player (captioned "Video" in Figure 2).

In fact, this sample application requires only two lines of code to be written for the functions so far described: one line in the click-event for the Command button control to open the video player OpenDoc document and one line in the click-event to open the audio player (captioned "Welcome" in Figure 2). You can write more to do fancier things, but for a functioning application that utilizes OpenDoc compound documents and VisualAge for Basic built-in controls, that's it.

Finally, after flipping between design mode and run mode for testing, a menu option was selected to create an executable. It can be packaged, along with any necessary dynamically linked libraries (DLLs) and other exe-

cutables, onto our Eddie's Kennel disc and shipped to potential customers. Business will rain down likes cats and, well, you know.

Speaking of canines, Eddie also wanted potential customers to see more of his favorite puppies, which is why we used the OpenDoc control instead of the built-in VisualAge Picture control. The OpenDoc control, by default, can be told to open itself during design mode, run mode, or when the application is packaged and sent to users. By opening the OpenDoc Image part, it is expanded into its own window. This window is separate from the form where the OpenDoc control resides. Figure 6 shows our application with one of the OpenDoc controls open (notice the gray box on the form, indicating that one of the OpenDoc controls is open).

There's lots more

That's not all, folks—our example doesn't really show off OpenDoc capabilities. Rather, it shows simple techniques for utilizing OpenDoc compound documents visibly and invisibly to achieve certain desired features. Real OpenDoc compound documents can have any number of OpenDoc parts in them. Our example used only very simple ones. Imagine the possibilities!

OS/2

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Resources:

Availability and other information for VisualAge for Basic for OS/2, Windows NT, Windows 95, and AIX can be obtained from <http://www.software.ibm.com/software/ad>.

For more information on OpenDoc and other OpenDoc products, CILabs, and OMG links, see IBM's Club OpenDoc on <http://www.software.ibm.com/clubopendoc>.

The multimedia parts used were obtained from the IBM Developer Connection CD-ROM.

Information about the Developer Connection program can be found at <http://www.developer.ibm.com>.



Dynamic Frameworks

BY ROGER SESSIONS

I recently went to Edinburgh to teach a class in SOM (System Object Model). My client had asked me to focus the class on the nondistributed aspects of SOM.

I must admit, I was at first perplexed by this request. I think of object distribution as the *raison d'être* for SOM. What, I wondered, could my client's interest in SOM be, if not object distribution? Language neutrality? Release-to-release binary compatibility?

It turned out my client was interested in all of these features. The group was even interested in object distribution. But the single greatest reason for using SOM was dynamic class loading.

Dynamic vs. nondynamic class loading

I have used dynamic class loading, but mostly for building generic DSOM servers. The class in Edinburgh gave me the opportunity to think about using this feature to develop truly dynamic frameworks.

Dynamic class loading allows programs to make use of classes that are unknown at compile and build time. Dynamic class loading allows arbitrary classes to be loaded at run time on an as-needed basis.

Let's consider a program that instantiates a dog object as defined by `dog.idl` shown in Listing 1. This program could be written in several ways, one of which is shown as version 1 of `test.c` (Listing 2). Let's briefly review the purpose of the more important lines of `test.c`.

Line 7 declares an object named `classObject` of type `SOMClass`. `SOMClass` is the default type of a class

object. Class objects know, among other things, how to instantiate objects of a given class (dog, in this case). I discussed class objects in more detail back in my May 1996 column ("Metaclass and the Dogs of Shakespeare," pp. 51-55).

Line 11 initializes the dog class. It does many things, among which is the instantiation of the dog class object.

Line 12 assigns the dog class object to the variable `classObject`. We get the dog class object from the macro `_dog`. All SOM classes have an associated macro with which one can get the class object for that class. The macro takes the form `_classname`; `_dog`, for example.

Line 14 uses the `somClass` factory method `somNew` to create a new dog object. This method is defined in `SOMClass` and is supported by all class objects. It returns a new object of the type for which the receiving object is the class object. In this case, the receiving object, `classObject`, is the class object for dogs, and, therefore, this method returns a new dog.

The rest of the program is standard stuff. Line 16 asks our new dog to bark. Line 18 deinstantiates the object. Line 19 frees our environment variable.

Version 1 of the program does not need dynamic class loading. It can build everything it needs directly into the test executable. If it does place the dog code into a DLL, it does so as a convenience.

Let's consider a variation on this program. Suppose we want this program to handle not only dogs, but arbitrary classes derived from dog. To make this program as general as pos-

sible, we will modify it to ask the user what kind of dog she wants and then create a class object for that particular type of dog.

Our existing program needs some modifications. We can't use `_dog` to find our class object because we won't know what class we are going to load until the user tells us.

For this type of a program, we have a new set of requirements. First, we need to map arbitrary strings to class objects. Second, we need a way of loading in object DLLs that we didn't know about when our executable was built.

SOM provides an object called the `SOMClassMgrObject`. This object knows how to map between strings and class objects and also how to load in object DLLs at run time. `SOMClassMgrObject` is actually a global object reference to an object of type `SOMClassMgr`. The `SOMClassMgrObject` can be instantiated explicitly, by calling the `SOMEnvironmentNew`, or implicitly, through any of several calls to the SOM run time; for example, `dogNew`.

The `SOMClassMgr` class and, therefore, the `SOMClassMgrObject` object, support many methods. The method we are most concerned with here is `somFindClass`. This method is the one which, given a string, returns a class object and, if necessary, dynamically loads in the DLL containing that class's implementation.

Based on our method description, we can predict that `somFindClass` will take several parameters. First, we expect it to take an `Environment` parameter, our standard parameter for returning error information. Second, we expect it to take a string

The World of Objects

Listing 1: dog.idl.

```
#include <somobj.idl>

interface dog : SOMObject {
    void bark();
    implementation {
        dllname = "dog1.dll";
        releaseorder: bark;
    };
};
```

parameter, the name of the class we want dynamically loaded and whose class object we want returned.

Oddly, neither of these two expectations is met. The **Environment** is not passed, because **SOMClassMgr** is one of those pre-SOM 2.0 classes that was created before SOM adopted the CORBA standard and, therefore, the **Environment** parameter. Also, the method does not take a string, although it does take a parameter that is closely related.

Instead of a string, **SOMFindClass** takes a parameter type called a **somId**. It's not worth going into the internals of a **somId** type. The most important thing to understand is that you can convert freely back and forth between a **somId** and a string, using the paired functions **somIdFromString** and **somStringFromId**.

Now let's look at the second version of **test.c**, modified to use the **SOMFindClass** method (Listing 3).

The significant changes in Listing 3 are:

- Line 9 declares a local variable of type **somId**.
- Line 10 declares a character array to hold the requested class name.
- Lines 15 to 17 ask the user to type in the requested class and stores the result.
- Line 19 converts the string containing the class name into a **somId**.
- Line 20 asks the **SOMClassMgrObject** to find the requested class, dynamically loading whatever DLL is necessary.
- Lines 23 to 26 print an error message if the requested class object couldn't be found.

Listing 2: Version 1 of test.c.

```
1. #include <dog.h>
2. #include <stdio.h>
3.
4. void main()
5. {
6.     dog snoopy;
7.     SOMClass classObject;
8.     Environment *ev;
9.     ev = SOM_CreateLocalEnvironment();
10.
11.     dogNewClass(0,0);
12.     classObject = _dog;
13.
14.     snoopy = _somNew(classObject);
15.     printf("Snoopy says:\n");
16.     _bark(snoopy, ev);
17.
18.     _somFree(snoopy);
19.     SOM_DestroyLocalEnvironment(ev);
20. }
```

Listing 3: Version 2 of test.c.

```
1. #include <dog.h>
2. #include <stdio.h>
3. 4. void main()
5. {
6.     dog snoopy;
7.     SOMClass classObject;
8.     Environment *ev;
9.     somId nameId;
10.    char dogType [100];
11.
12.    somEnvironmentNew();
13.    ev = SOM_CreateLocalEnvironment();
14.
15.    printf("Snoopy's Type: ");
16.    fflush(stdout);
17.    scanf("%s", dogType);
18.
19.    nameId = somIdFromString(&dogType[0]);
20.    classObject = SOMClassMgr_somFindClass
21.        (SOMClassMgrObject, nameId, 0, 0);
22.
23.    if (!classObject) {
24.        printf("Sorry... Can't load %s\n", dogType);
25.        exit(0);
26.    }
27.
28.    snoopy = _somNew(classObject);
29.    printf("Snoopy says:\n");
30.    _bark(snoopy, ev);
31.
32.    _somFree(snoopy);
33.    SOM_DestroyLocalEnvironment(ev);
34. }
```

In line 21, you may notice two extra parameters on the **somFindClass** invocation: the two zeros. These methods are used to specify major and minor version requirements, a topic we won't cover here. Using zeros for

these parameters tells the method we aren't interested in versions.

To dynamically load in the DLL corresponding to a class, the **SOMClassMgrObject** must be able to determine which DLLs implement

which classes. It finds this information by using the interface repository, a run-time-accessible database that contains information about classes, including the name of the DLL in which the class implementation lives.

When we finish building our program and the dog class library, we will have both a **test.exe** and a **dog1.dll** created. Here's a typical run of our test program, with user input in bold:

```
Snoopy's Type: dog
Snoopy says: Generic dog noise
```

Of course, there are other possible outcomes. Consider this run:

```
Snoopy's Type: littleDog
Sorry... Can't load littleDog
```

The difference between these two program runs occurs when **somFindClass** attempts to locate the requested class in the interface repository. In the first case, **dog** is found in the interface repository. In the second case, **littleDog** isn't.

Now, this particular demonstration may not be very convincing. After all, **test.c** contained **dog.h**. How can we be sure that the **test.exe** was really using dynamic loading and wasn't merely calling code that had been preloaded in the **dog.h** file?

Returning from Edinburgh, it occurred to me that frameworks are a lot like travelers.

The best proof that **somFindClass** works as advertised is to use it to load a class that the executable couldn't possibly have known about at compile

or build time. Therefore, we'll build a brand new DLL, one containing a **littleDog**. Its IDL definition will look similar to that of **dog**, with an override of the **bark** method. We will implement the **littleDog bark** method to type "woof woof".

The important point is that **test.c** knows nothing about **littleDogs** or their DLLs. If we rerun this program without recompiling or rebuilding, we get a completely different result by virtue of the newly available **littleDog** DLL. The new output looks like:

```
Snoopy's Type: littleDog
Snoopy says: woof woof
```

Of course, our test program will still fail if we ask it to load a class we haven't yet implemented (say, **bird**). But at least now we know how to solve that problem.

Importance of dynamic loading

Most people will not use dynamic loading to write test programs that

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will load on-demand dog classes. Most people will use this capability to create frameworks that can manipulate classes that were unknown at the time the framework was built. This trick is very useful.

For example, consider the problem my client is trying to solve. These folks were developing a large framework to manipulate business objects. The resulting framework executable will be distributed throughout the company. Other groups in the company will create their own specialized business objects and use the framework executable to manipulate them.

My client's code won't necessarily require a user to enter in the class of a business object. Other ways of letting the framework know about newly available object classes are possible. Configuration files are one other common solution.

Without dynamic loading capability, framework distribution would have been very difficult. At the very least, the framework would have had

to have been distributed as compiled .obj files, and framework programmers would have had to rebuild the product each time they wanted to add a new business object. Building a large, complex framework is by no means a trivial task.

Frameworks and travelers

Returning from Edinburgh, it occurred to me that frameworks are a lot like travelers.

There are those frameworks that are static. They are hardwired at compile time to specific classes and work well as long as they aren't expected to deal with any others. These frameworks do not require dynamic class loading. They are like the traveler that wants to plan a trip's every detail before taking the first step.

Then there are those frameworks that are dynamic. These frameworks require dynamic class loading to ensure that *any* object can be manipulated, even those unknown at compile time. These frameworks are like

the traveler that will take in any new sight, any new experience, at the drop of a hat.

I am grateful to Edinburgh for reminding me how much I enjoy run-time coordination of both my travels and my frameworks.

The code for this article, including the makefiles and files not shown here, can be downloaded from the OS/2 Objects Home Page. Go to <http://www.fc.net/~roger/owatch.htm> and look for a link to code for OS/2 Magazine articles. **OS/2**

Roger teaches and consults on OS/2 Object technology. His books include the recently published Object Persistence—Beyond Object-Oriented Databases. Roger also publishes the OS/2 Objects Home Page (<http://www.fc.net/~roger/owatch.htm>). He can be contacted at roger@fc.net.

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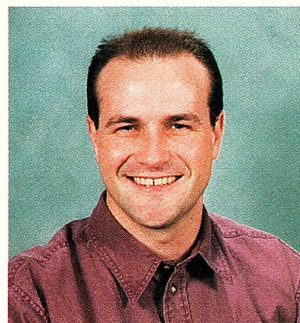
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A Picture Perfect Control: The Finale

BY MARK BENGE AND MATT SMITH



In this issue, we conclude our discussion of OS/2 Presentation Manager (PM) frame windows. Last month, we covered adding extensions to the menu bar. Now, we'll add not one but two extensions below the frame's client and illustrate some programming concepts that you may find useful.

Some assembly required

Well, the kitties are definitely purring over the latest additions to our frame. (The bribe of a few kitty treats didn't hurt either.) Our initial area of focus is the client window. Adding frame extensions in the area of the client window requires more work than adding them to the title or menu bar. You can add a frame extension above or below, or to the left, or to the right of the client window. The key is that you need to process the `WM_CALC-FRAMERECT` message. You process this message to calculate the rectangle of the client and the frame windows. The low word of `mp2` indicates which rectangle to calculate: If it is `TRUE`, you calculate the client rectangle; if `FALSE`, the frame rectangle. To assist you, `mp1` contains a pointer to the relevant `RECTL` structure for the calculation: The frame `RECTL` for the client calculation and the client `RECTL` for the frame calculation.

We place our new extensions below the client window; thus, we calculate the client rectangle by adjusting the `yBottom` and `yTop` fields based on the height of one of the extensions, a static text control, and the width of the separator bar. The separator bar is a series

of lines that we draw to visually separate the client window from the extensions. We also calculate the client rectangle by calling the default frame window procedure to allow it to subtract the child frame controls from the client rectangle's height. Conversely, we calculate the frame rectangle by adjusting the `yBottom` and `yTop` fields based upon the height of the static text control and the width of the separator bar. These calculations are shown in Listing 1.

Formatting the frame

Another area that you need to focus on when adding extensions to the client is the formatting of the frame. As we discussed in the previous two articles, you need to identify all of your frame extensions during the processing of the `WM_FORMATFRAME` message. We test for the client ID, `FID_CLIENT`, in the frame control subclass procedure, `FrameWndProc`. This test is performed by iterating the `SWP` array via the pointer passed in `mp1`. After the client's entry is found, the processing is almost the same as the processing for the title and menu bars. In the previous two issues, we

added two frame extensions: a graphic push button to the title bar and a drop-down combo box to the menu bar. Now, we add a static text and animated window controls below the client window. The code that adds these controls in the processing of `FID_CLIENT` during the `WM_FORMATFRAME` message is shown in Listing 2.

Also, because we've added two more frame extensions, bringing the total number of extensions to four, we reflect this new total by incrementing the child frame control count on the return statement for both the `WM_FORMATFRAME` and the `WM_QUERYFRAMECTLCOUNT` messages.

More frame frills

The static text control that we add as an extension below the client displays information about the current menu selection. We provide additional logic that processes the `WM_MENU-SELECT` and the `WM_MENUEND` messages in the frame control subclass procedure, `FrameWndProc`. We handle the `WM_MENUSELECT` message to display the selection's information that is stored within the string table of the sample's resources. We handle `WM_MENUEND` to clear the last selection's information when the menu control is about to terminate. The menu selection processing did present us with a challenge. We noticed that when we initially clicked on a menu such as `File`, we received a `WM_MENUSELECT`. Also, when we moved the selection to a menu item such as `Exit`, we again received a `WM_`

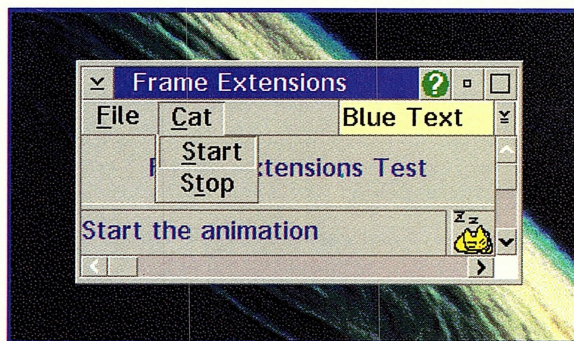


Figure 1: The finished frame.

Tales from the trenches

Although our bitmaps are 28×28, you may have noticed that we set the size of our animated window control to 28×29. We encountered a clipping problem related to the inclusive and exclusive nature of the source and target bitmap points. Our resolution to the problem, which we discovered after trial-and-error, was to increase the height of the control to 29.

MENUSELECT. However, when we moved the selection back to the File menu, we did not receive a WM_

MENUSELECT. Therefore, the selection information displayed in the static text extension was wrong. To re-

Listing 1: WM_CALCFRAMERECT processing.

```
case WM_CALCFRAMERECT:
{
    /******
    /* Calculate the requested rectangle.
    /******
    BOOL rc = TRUE;
    PRECTL pRectl = (PRECTL)mp1;
    LONG lExtensionHeight = STATICTEXT_HEIGHT + SEPARATOR_WIDTH;
    if ( SHORT1FROMMMP(mp2) )
    {
        /******
        /* Calculate the rectangle of the client
        /******
        /*-----
        /* Call default frame window procedure to subtract child frame
        /* controls from the client rectangle's height.
        /******
        LONG lClientHeight;
        rc = (BOOL)DefFrameWndProc( hWnd, msg, mp1, mp2 );
        /******
        /* Position the static text frame extension below the client.
        /******
        lClientHeight = pRectl->yTop - pRectl->yBottom;
        if ( lExtensionHeight > lClientHeight )
        {
            /******
            /* Extension is taller than client, so set client height to 0.
            /******
            pRectl->yTop = pRectl->yBottom;
        }
        else
        {
            /******
            /* Set the origin of the client and shrink it based upon the
            /* static text control's height and the width of the separator
            /* bar.
            /******
            pRectl->yBottom += lExtensionHeight;
            pRectl->yTop -= lExtensionHeight;
        }
    }
    else
    {
        /******
        /* Calculate the rectangle of the frame
        /******
        /*-----
        /* Set the origin of the frame and increase it based upon the
        /* static text control's height and the width of the separator
        /* bar.
        /******
        pRectl->yBottom -= lExtensionHeight;
        pRectl->yTop += lExtensionHeight;
    }
    return( (MRESULT)rc );
}
```

solve this dilemma, we borrowed a trick from the **IInfoArea** class of the IBM Open Class Library. The trick is to test for the deselection of a menu item and to dispatch a **WM_MENUSELECT** message if the menu selection is valid. Listing 3 shows the code that implements this logic. We add the animated window control as an extension below the client to humor our feline friends. It iterates a series of bitmaps that are stored in a bitmap array and displays them via **Gpi-WCBitBlt**. We chose to use a timer to control the animation, but could have used a secondary thread if not for our catatonic nature—remember our previous disclosures that we're lazy! You start the animation via the **Cat** menu.

We draw the separator bars by processing the **WM_PAINT** message in the frame control subclass procedure, **FrameWndProc**. The bars are a series of lines that are drawn using different colors to add the three-dimensional effect. They are drawn to provide a visually appealing separation of the extensions from the client window and from each other.

More sizing the frame

We updated the window tracking logic to account for the new extensions. Because we took the trouble to add frame extensions to the frame control, we thought it might be nice for these extensions to remain visible at all times. Therefore, we now include the heights of the new extensions, the separator bar, and the horizontal scroll bar in our minimal height calculations. We include the horizontal scroll bar to prevent the new extensions from being clipped.

Déjà vu

You may be asking yourself, "Haven't I seen all of this some place before?" If you're familiar with VisualAge C++ for OS/2 3.0 or its predecessor, C Set++ 2.1, you know that a robust implementation of frame extensions support is provided via the IBM Open Class Library. The development of frame extensions isn't generally a trivial task. The lack of comprehensive documentation on the subject also increases the pitfalls of the use of extensions. Hopefully, we've provided those of you who develop in C with

enough background information to encourage the use of frame extensions in your applications. For those of you using the IBM Open Class Library, we hope we've given you more insight into the design of the classes that support frame extensions.

Stained and varnished

Our finished frame is shown, stained and varnished, in Figure 1. Please join us next time, as we elaborate on a new and exciting tool that extends Java applet support into the world of C-based PM applications. **OS/2**

Acknowledgments

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Resources:

You can download *framctl3.exe* from these electronic sources:

CompuServe's OS2AVEN forum (OS/2 Magazine Section).

File area 11 on the IBM PCC BBS, (919) 517-0001, OS/2 Tools section on the OS/2 BBS for IBM TALKLink customers.

FTP to prominare.com and log in as anonymous. The source is located in the */pub/prominare/guicornercodecache* subdirectory.

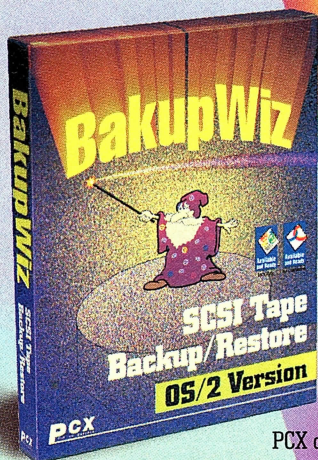
Visit the GUI Corner home page at www.prominare.com/prominare/os2mag.vol3num12.html.

Listing 2: FID_CLIENT processing during WM_FORMATFRAME.

```
if ( WinQueryWindowUShort( swpArr[i].hwnd, QWS_ID ) == FID_CLIENT )
{
    /******
    /* Initialize the SWP for our static text control. Since the SWP */
    /* array for the std frame controls is 0-based and occupy indexes */
    /* 0 thru n-1 (where n is the total count), and the graphic button */
    /* and combo box occupy n and n+1, we use index n+2 for our */
    /* static text control. */
    /******
    swpArr[ulIdx+2].fl = SWP_MOVE | SWP_SIZE | SWP_NOADJUST;
    swpArr[ulIdx+2].cy = STATICTEXT_HEIGHT;
    swpArr[ulIdx+2].cx = swpArr[i].cx - CAT_BMP_WIDTH -J
    SEPARATOR_WIDTH;
    staticTextPos.y = swpArr[ulIdx+2].y = swpArr[i].y;
    staticTextPos.x = swpArr[ulIdx+2].x = swpArr[i].x;
    swpArr[ulIdx+2].hwndInsertBehind = HWND_TOP;
    swpArr[ulIdx+2].hwnd = hwndStaticText;
    /******
    /* Initialize the SWP for our animated window control. We use */
    /* index n+3 for our animate window control. */
    /******
    swpArr[ulIdx+3].fl = SWP_MOVE | SWP_SIZE | SWP_NOADJUST;
    swpArr[ulIdx+3].cy = CAT_BMP_HEIGHT;
    swpArr[ulIdx+3].cx = CAT_BMP_WIDTH;
    animatedCatBmpPos.y = swpArr[ulIdx+3].y = swpArr[i].y;
    animatedCatBmpPos.x = swpArr[ulIdx+3].x = staticTextPos.x +J
    swpArr[ulIdx+2].cx + SEPARATOR_WIDTH;
    swpArr[ulIdx+3].hwndInsertBehind = HWND_TOP;
    swpArr[ulIdx+3].hwnd = hwndAnimate;
    /******
    /* Adjust the origin and height of the client to accomodate our */
    /* static text and animated window controls. Remember to leave */
    /* enough space for the separator bar. */
    /******
    swpArr[i].y += swpArr[ulIdx+2].cy + SEPARATOR_WIDTH;
    swpArr[i].cy -= (swpArr[ulIdx+2].cy + SEPARATOR_WIDTH);
}
```

Listing 3: Resolving the WM_MENUSELECT dilemma.

```
/******
/* Menu item is being deselected. Therefore, get the owner */
/* window. If the owner is another menu, then reset the static */
/* text to the menu text. Otherwise, clear the static text. */
/******
HWND hwndOwner = WinQueryWindow( (HWND)mp2, QW_OWNER );
if (hwndOwner)
{
    WinQueryClassName( hwndOwner, 20, buffer );
    if ( !memcmp( buffer, "#4", 3 ) )
    {
        SHORT sItem = (SHORT)WinSendMsg( hwndOwner,J
        MM_QUERYSELITEMID, 0, 0 );
        if ( ( sItem == MIT_ERROR ) || ( sItem == MIT_NONE ) )
            WinSetWindowText( hwndStaticText, NULL );
        else
        {
            WinSendMsg( hwnd, WM_MENUSELECT, MPFROMSHORT(sItem),J
            MPFROMHWND(hwndOwner) );
        }
    }
    else
        WinSetWindowText( hwndStaticText, NULL );
}
else
    WinSetWindowText( hwndStaticText, NULL );
```

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is included with each PortaTape.

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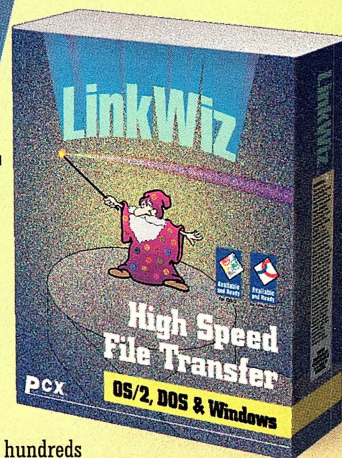
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MQSeries for OS/2; Building the Dream Machine

BY GUY SCHARF

MQSeries for OS/2

MQSeries for OS/2 is IBM's "commercial messaging" product. With it, you can transfer information of any kind between applications, regardless of the type of computer or network. IBM has versions of MQSeries for more than 17 platforms, including HP, Sun, Tandem, and IBM OS/400 and MVS mainframes. On the Intel platform, MQSeries servers are available for OS/2 and Windows NT. MQSeries for OS/2 supports OS/2, AIX, DOS, and Windows 3.1 clients.

Two key characteristics of MQSeries are assured delivery and time-independent processing of messages. A common configuration would be to have a number of client machines connected on a LAN to an MQSeries server. That server queues messages from the client to other applications, which may be connected to the same or different MQSeries server. The receiving application takes appropriate action on the message. If desired, it can send a message back to the originating client application or send one or more messages to other applications.

In Figure 1, Client 1 wants to send information to Client 2. For example, Client 1 might be an application that places an order, and Client 2 might be a fulfillment system. Client 1 is connected via network to Server A. Client 1 queues the message containing the information packet to Server A. Server A forwards the message to Server B when it can. Server B similarly forwards the message to Server C, where the message is available to Client 2

when Client 2 asks for a message addressed to it. Client 2 then processes the request.

This "store and forward" mechanism allows time-independent processing. The connection to the destination application need not be up when the client is ready to send a message. Only its local MQSeries server need be available to queue the message for later transmission. MQSeries assures delivery once and only once.

Messages can contain any desired application data. You could send an accounting transaction, a picture, a request for service, a report, or any other digitized information. As a program-to-program communications tool, MQSeries allows you to define the message contents to meet your application requirements.

From the perspective of MQSeries, all applications are clients of its servers. From the application designer's point of view, MQSeries is middleware that can be used to establish peer communications between applications, to talk to an application server, or to implement other relationships.

MQSeries offers great configuration flexibility. MQSeries clients and servers may reside on the same or separate machines, and the routing of messages between client and server applications can be modified easily, without changing any programs. You could change a service provider from a UNIX mainframe to an OS/2 system just by changing the routing information in the MQSeries control files. The client application would never know the difference.

MQSeries for OS/2 supports the Micro Focus COBOL compiler and

IBM C Set++ and VisualAge C compilers. Other vendors also support MQSeries. JBA has announced support in its Guidelines product. Lotus Notes also supports MQSeries connections.

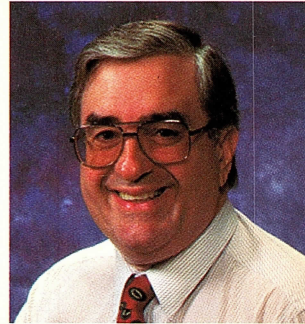
I examined MQSeries for OS/2 2.0. I also briefly looked at AIX and Windows NT products.

Ease of use

Installation from CD-ROM requires 22MB of disk space for all components. Usually, though, you will not need everything, and the disk requirements on some clients may be less than 1MB. The documentation alone takes almost 10MB but will not be needed on most systems.

The programming API, with its few commands, is not complex. MQSeries client programs use nine primary function calls: MQCONN and MQDISC to create and destroy connections to the MQSeries server; MQOPEN and MQCLOSE to open and close a queue; MQPUT, MQPUT1, and MQGET to put and get messages; and MQINQ and MQSET to inquire about and to set object attributes. Two other commands, MQCMIT and MQBACK are used to manage sync points on OS/2 and some other platforms. Each function accepts control blocks to manage the service requests. This Message Queue Interface (MQI) API is common to all platforms, making it easier to move MQI applications between platforms.

Befitting an enterprise application, the data representation is more similar to COBOL than it is to C. For example, strings are not null-terminated. Different platforms represent data differently—integers may have high



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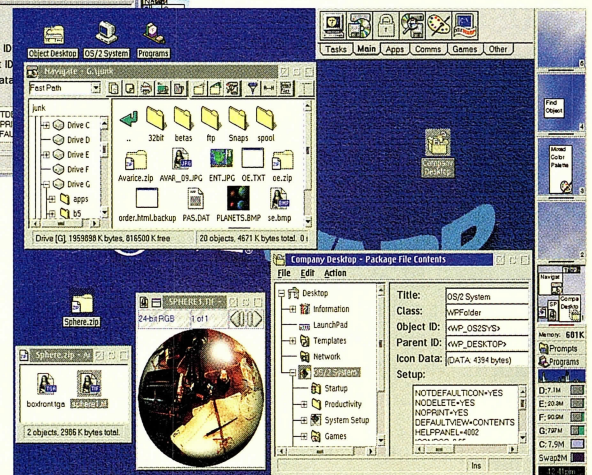


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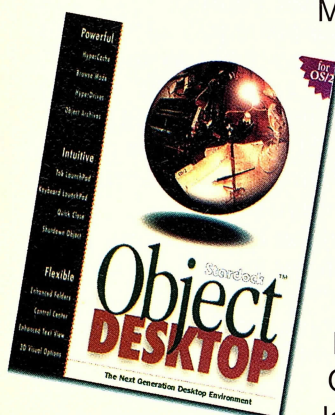
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and low bytes in different orders, one system may support ASCII and another EBCDIC, and so on. MQSeries includes conversion routines that automate conversion of text and predefined message formats. For your application data, you may have to write a user exit to convert the incoming message to your platform's native format. A CRTMQCVX conversion utility simplifies this process by reading a message definition as a C language structure and generating the conversion code for the exit.

Administration of MQSeries is more complex and less easy to use. No graphical interface exists. Instead, you have to use a command language with long and rather ungainly commands. Normally, however, you will place these commands in a script file that can be reused instead of typing them individually into the command processor.

MQSeries ensures that messages are not lost or delivered twice. However, that guarantee applies only to each "unit of work"—from one server to the next. MQSeries does not offer end-to-end security at the application level in a complex, multi-hop environment. For example, in Figure 1, if a message arrives at server B and the hard disk and backup on server B are then lost before the message is delivered to server C, Client 1 will not automatically learn of the loss. MQSeries has several tools to help you manage this situation. All messages can be logged and messages can be selectively retransmitted. Some programming will be required, but simple acknowledgement messages may often be sufficient.

Documentation

MQSeries for OS/2 includes two manuals: *Installation and System Management Guide* and *Command Reference*, totalling 450 pages of documentation. Five additional books are included in IBM BookManager Format, including the *MQSeries Application Programming Guide*. Addi-

tional hard-copy documentation is available for MQSeries planning and general information and for other supported platforms. More than 50 MQSeries publications are listed in the manual. I found the documentation clear, especially considering the scope of MQSeries capabilities.

The configuration samples are limited. Setting up your first MQSeries configuration may be confusing. IBM does have an MQSeries Technical Workshop that focuses on configuration and has many practical exercises. This course is a good introduction to MQSeries. Sample C

result in a more robust application with higher availability than one requiring a real-time connection to another service.

For example, MQSeries would not be a suitable way to save application data to a local disk, but it would be a very effective solution for sending an archival copy of application data to a corporate archiving center. You need to be certain that the data is archived, but you probably don't care how long it takes the data to reach the archiving center. MQSeries will address such an application very nicely.

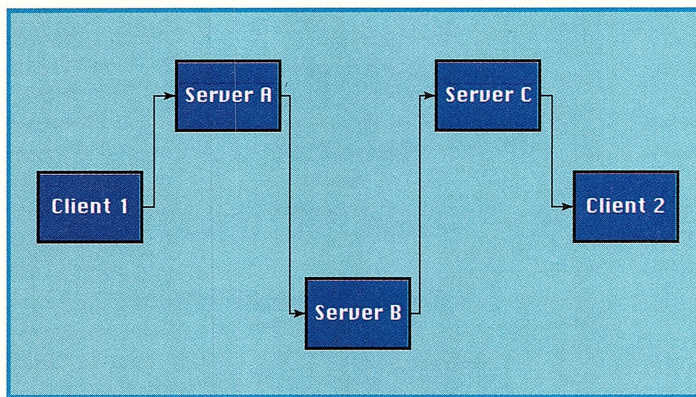


Figure 1: Forwarding a message through three servers.

and COBOL programs are included, but their MAKE files are not.

Limits of applicability

MQSeries offers delivery of information packets without loss or duplication across multiple platforms. Message formats are platform-independent, allowing businesses to change hardware and software systems for parts of the enterprise more easily. Message delivery is time-independent, and the message delivery time is not guaranteed, especially if the sending and receiving clients are on different MQSeries servers. Even if both clients and server are on the same hardware, MQSeries imposes no requirement that the receiving application be running when the sending application queues a message for it.

This time independence can be an advantage, freeing the designer to link applications more loosely and more reliably. Redesigning an application to use a messaging model may

Summary

IBM's MQSeries provides a foundation on which to build enterprise applications. As a robust, multiplatform messaging system, it allows businesses to build enterprise solutions using the best hardware and software for each application and then to interconnect the applications. With its platform independence, MQSeries allows the enterprise to grow and ex-

pand without requiring that all interfaces be redesigned when one platform is replaced with another.

Dream Machine

We all dream about the "perfect" machine. Only rarely can we afford to put that dream together. This year, I decided to do it.

My lust started last year, when the 200MHz Pentium Pro chip was released. My rule of thumb is that I want to see a threefold improvement before upgrading. I had been using a 486DX50 system and had not seen a Pentium that met that requirement before possibly the 133MHz and definitely the 166MHz models. With the 200MHz Pentium Pro now available, I didn't want to be stuck with an "old-fashioned" Pentium.

I had looked at the specs for some systems and was always dismayed by the 256K cache. That seemed a potential bottleneck. Given the premi-

um price of these chips, I didn't want to buy a bottleneck.

In July, it had come time to get a new machine, no matter what size the cache. As usual, I checked out Clyde Washburn's list of AMI motherboards. To my surprise, AMI had a 200MHz Pentium Pro with 512K cache motherboard—the "Merlin PCI" board. I thought the name prophetic, since I planned to run Merlin (OS/2 Warp 4.0) on this system. I talked to Clyde and discovered they were still waiting for the boards. I ordered anyway to get on the waiting list. Two weeks later, the system arrived.

The next question was how much memory to get? The application with which I'm now working requires 64MB RAM to link easily with debug options enabled. Memory keeps getting cheaper, so I decided to get 128MB as an experiment. I knew the faster CPU was likely to spend more time waiting, and I hoped to improve performance by using a RAM disk.

I didn't give much thought to the SCSI adapter. I had an AHA-2940UW PCI fast-wide adapter in another system, and it worked well—so I picked the same adapter for the new system. I already had a high-performance hard drive, a 4.3GB Seagate 15150W and planned to use it in the new system. I added a 2GB HP drive to simplify setting up the new system. I had planned to use the Toshiba 6x SCSI CD-ROM drive, but it was no longer available. However, a Toshiba 5602B 8x IDE CD-ROM was available. And cheap, too—\$110. So I put two of them in the system. I also needed another tape drive. Should I be conservative, or splurge? Since I was splurging on everything else, I got an Exabyte 8505-XL internal drive. This drive will write 7GB uncompressed data on one 8mm tape.

A year ago I bought an IBM P201 20" Trinitron monitor that I like very much. I wanted 1600x1200 resolution, so I picked the ELSA Winner Pro 2000-X with 4MB RAM. I added a 3COM 3C509B for the Ethernet connection because I use the same card in other machines—

no extra thought needed there. And, just for fun, I tossed in a Sound Blaster AWE32 Plug 'n Play (PnP) card and a pair of Yamaha speakers.

With everything in hand, it was time to put all the cards in the machine and see if it worked. I wasn't expecting everything to go without a hitch, and Murphy didn't let me down. First, I installed OS/2 Warp Connect, and, for most part, the system worked from the beginning. Then I installed the Merlin gamma, and it worked better. With some

est Adaptec driver, tape backups now work flawlessly. I'm working with the vendors to find out what's wrong with the newer board. I also have a paint problem with seamless Windows sessions. But I'm still running the Merlin gamma, so I'll follow up on that problem after I've installed OS/2 Warp 4.0.

Performance

This system has met my performance goals, the most important of which is compilation speed. I have a large application that requires 2 hours 45 minutes to compile on a highly tuned 486DX50 system. The same application compiles in 55 minutes on a 120MHz Pentium and 64MB RAM with 85% CPU utilization. On the 200MHz Pentium Pro, compilation took only 30 minutes with 65% CPU utilization. Seeking a way to bring the unused CPU power to bear, I installed Super Virtual Disk, a shareware product that allows you to create a disk of up to 16MB in virtual memory. With the compiler's include and temporary files loaded on the virtual disk, compilation now takes only 20 minutes, and the CPU is 95% busy. In some other tests, the new system is up to four times faster than the 120MHz Pentium.

So, how is everything else? The Sound Blaster AWE32 and Yamaha speakers are awesome. I hear the greatest sounds when I open and close folders or play .wav files! Maybe later I'll find a more interesting use for this card. It supports Merlin's VoiceType well, too.

The 8x CD-ROM is delightful. It makes installing large applications and reading documents much faster. Having two CD-ROM drives hasn't proven too useful yet, but I expect that to change in time. The tape drive is working well, and backups are running without a hitch. Both hard disks work well, although the HP drive runs hotter than I expected. I added an extra exhaust fan to make certain enough air circulates.

I had to drop the screen resolution from 1600x1280 to the essentially equivalent 1600x1200 to get

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adjustments, the system is working almost perfectly and is now my primary development system.

I had to disable the PnP option on the Ethernet card before it would work. The IRQ is specified in the protocol control files, so I could not allow the PnP BIOS to assign an arbitrary interrupt. I had conflicts in *config.sys* between the position of the *com.sys* and AWE32 drivers with OS/2 Warp Connect, even with updated AWE32 drivers. Merlin solved the problem—both serial ports and the AWE32 card worked perfectly with the first installation.

The most serious problem was that the system would hang before completing a tape backup. After trying several backup programs and Adaptec drivers, I finally replaced the 2940UW board with an older 2940UW from another system. Coupled with the lat-

the desktop to work properly. This high resolution revealed an unexpected problem. I have several programs that are hardcoded to use 8 pt Helvetica font. At 1600x1200 resolution, even on a 20" monitor, that font is too small to read comfortably. But I do love all the windows I can get on the screen, so I continue to use the high resolution.

My experience with new computers is that it takes me several days' work to get them up and running with my desktop set up the way I want. Then it takes a few months to work out the little problems. This machine will be no different. If I were to do this all over again, I would choose the same CPU and motherboard. Having 128MB RAM appears to be only marginally useful to me. The AWE32 card and second CD-ROM drive haven't proved their worth yet, but I think they will. Anyway, I like the sounds. The fast-

wide hard drive and SCSI host adapter are a must for me; I trust the current problem with the newer card will be resolved. The Exabyte tape drive is excellent, but if I didn't need the capacity, I'd get a 4mm DAT drive instead. I like the smaller 4mm tape cartridge.

Summary

Now I have my hot system, albeit an expensive one. I figure that gives me bragging rights for about 90 days, after which time some other system will be faster. By the time you read this column, AMI should have released a dual Pentium Pro motherboard; other vendors have them now. But dual-processor motherboards are a frustrating dream because IBM does not include SMP support with the latest version of OS/2 Warp.

Now it's time to get back to work and make this machine pay for itself!

OS/2

Guy Scharf is president of Software Architects Inc., a software development firm specializing in developing OS/2 Presentation Manager applications for vendors and business. He can be reached by email to guy@swarc.com.

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```
call DosSetExceptionHandler
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call CPP0830_exception_proclnt
mov eax, [esp+20h]
call sub_10954
push 109AC
push 0FF01h
call DosExitList
call sub_109DC
push 10000h
mov ecx, large dword ptr ds:CPP0830__environ
sub esp, 0Ch
mov edx, dword_203AC
mov eax, dword_203AB
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call CPP0830_exit
```

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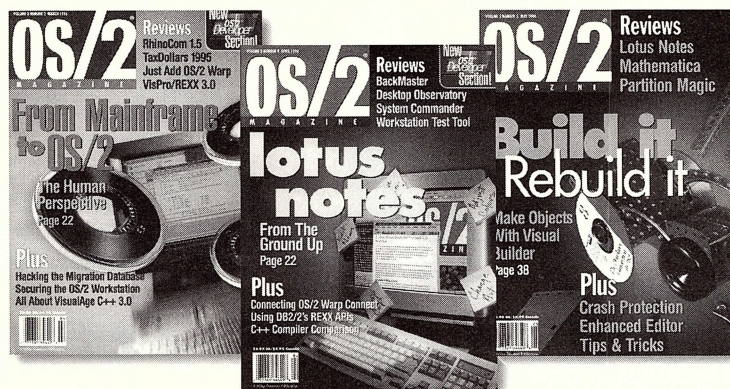
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Graphic Stream

**PHOTOGRAPHICS 1.0; ZIPSTREAM 1.20, CRYPTSTREAM 1.20,
AND ZIPSTREAM SECURE 1.20**

BY BRIAN PROFFIT

PhotoGraphics 1.0

From its earliest days, OS/2 has seemed to be the platform that would attract system-intensive applications. The richer memory model and multithreading capability, combined with preemptive multitasking, brought a new level of power to the desktop.

Of all applications, perhaps graphics apps, with their huge memory and calculation requirements, demand the most of an operation system. Therefore, it's no surprise that, this month, we look at another high-level graphics application that exploits the particular capabilities of OS/2 Warp.

Object-oriented images

Many graphics packages treat your image as a single bitmap. As you draw new items, their bit patterns overlay whatever was in that part of the image before. If you then move the new item, you'll discover that the area underneath has been erased—the old information is gone. The quality of your image is also limited by the resolution of your display and the ability of the graphics format you have selected (such as TIFF or GIF) to render the image.

PhotoGraphics treats images as a series of separate objects. These objects may overlay each other (at varying degrees of transparency) in unlimited layers, but they maintain their individuality, giving you three-dimensional control of the object layers. Thus, if you move an object to another part of your image, any object that was underneath it again

becomes visible. In fact, you frequently change an object's appearance without modifying the original object—you simply overlay it with an object of the same size but with different fill characteristics.

Suppose you want to soften the edges of a person's face. You duplicate the bitmap object containing the face, but give the new object a fill characteristic of blur rather than bitmap. You can now adjust the blur for the appropriate level of softening. Change your mind? No problem, you can delete the blur object and the bitmap object underneath remains unchanged. You might similarly overlay the bitmap with a contrast/brightness object, a sharpness object, or another special effect, such as waves.

The quality of your images is not limited by your display adapter either. PhotoGraphics works in a minimum of 16-bit (65,536 color) mode, regardless of your current display adapter setup. In fact, if your display is in a lower color mode, the program slows down as it calculates the dithering necessary to render the image on your display. Images are maintained in a resolution-independent state until you choose to render them in a graphic format (again, like TIFF.) PhotoGraphics stores GDO file format images in a vector form, meaning they can be redrawn in their precise original form. Resizing objects causes them to be smoothly redrawn at the new size, without any of the pixellation that occurs when bitmaps are resized.

Objects can be grouped together to create new compound objects.

Those objects can then be moved and resized, with all components changed together. You could then ungroup the objects and manipulate them separately again.

Power that is usable

PhotoGraphics is set apart from other packages by the skill with which the power is made accessible to the user. Not that the program is intuitive—no application with this many options could be totally intuitive. But it is very well designed, and that design is topped off by the best tutorial of any OS/2 graphics package I've seen. The fantastic tutorial makes the power of this package very approachable. I became confident about my ability to use PhotoGraphics quite quickly. It leads you into some areas that become as complex as things in ColorWorks, but it leads you there gradually and helps you really understand what you're doing as you progress. Because the tutorial encourages understanding rather than rote robotic step-following, I left each lesson confident that I could apply the technique to my own images.

As you make changes to an image, PhotoGraphics exploits OS/2's power by rendering the changes in background threads while you continue to work with the image in the foreground. I found it extremely fast, working on a 40MB Pentium-90 with a 2MB graphics adapter. At least part of the perception of speed is due to the fact that, rather than recalculate each pixel of a particular resolution, the vector technique simply redraws the changed space at whatever size you are currently viewing.



Those updates are facilitated by the ability to cancel mouse actions in progress. Hold the right mouse button down on an object and move it slightly in any direction. The background rendering thread automatically begins redrawing the image, so you can preview the new position. Don't like the change? If you press the left button before releasing the right button, the move is cancelled and the image returns to its original state. This is a more convenient way to preview the results of operations than performing the operation and then having to select Undo.

Operations such as resizing or rotating an object are clarified by the the custom pointers that PhotoGraphics uses to let you know what mode you are in. The unique pointers make more precise control possible, particularly when manipulating some of the tiny points that make up the edges of an oddly shaped image.

Accessibility of information

The TrueSpectra Web site has a good collection of information for those considering PhotoGraphics. A collection of frequently asked questions is available there, as well as a discussion database to which you can post questions and discuss techniques with

TrueSpectra staff and other users. TrueSpectra is also holding a contest for the best user-created images, with six winners each month receiving free upgrades for two years. Winners and many others will have their work displayed at TrueSpectra's Web site.

Glee or flee

PhotoGraphics is a superior combination of processing power and usability. I came away with the feeling that a professional graphic designer could do just about anything with PhotoGraphics that could be done with ColorWorks. One small caveat: PhotoGraphics lacks a monitor calibration/gamma correction facility. A significant problem for professionals, however, is that PhotoGraphics does not support color separation output. That feature is reserved for PhotoGraphics Pro, which should be available around the end of the year. The Pro version should also include REXX scripting.

But unlike ColorWorks, the PhotoGraphics user doesn't have to be a professional graphic designer. Professional, affordable, and easy to use, PhotoGraphics is clearly the best image-processing package that I've ever used. It's a great tool, whether you're designing a glossy sales brochure or just a birthday card.

ZipStream 1.20

I'm sure I've stated Proffitt's Law in these pages before, but as a reminder: *The amount of data you want to keep will always grow to exceed the available disk space.* Even in these days, when gigabyte drives are the norm, there never seems to be enough space. As a result, the demand for data compression products continues unabated.

A new version of an old favorite

When I reviewed ZipStream 1.03 ("Compression Protection," August 1995, pp. 20-24), I was quite complimentary of the fact that it accomplished its compression without requiring you to repartition your disk or create new nonstandard disk structures such as containers. By using only standard OS/2 disk functions, ZipStream gave me greater confidence in the integrity of my data. Now, more than a year later, ZipStream is still the only OS/2 data compression product that does so entirely within the OS/2 structure, using the Installable File System (IFS) facility.

That does bring some restrictions, though. ZipStream must be installed in the OS/2 boot partition, so the IFS can be initialized correctly during the boot process. Your OS/2 device drivers cannot be compressed, because they are loaded before installable file systems. On the other hand, it means that any file system that maps to a drive letter can be compressed. You can compress files on disks and network drives just as easily as your local hard disk. It also means that you can compress files in either FAT or HPFS partitions.

Compressed and uncompressed files stay together on the same partition, so you can "test the water" by just compressing a few files at a time until you're confident. Even though they're on the same partition, you access compressed files with a different drive letter. Use of that letter, which you assign with the `zsattach` command, triggers ZipStream into automatic compression/decompression. The use of a different drive letter does mean that you may have to change a number of references in `.ini`

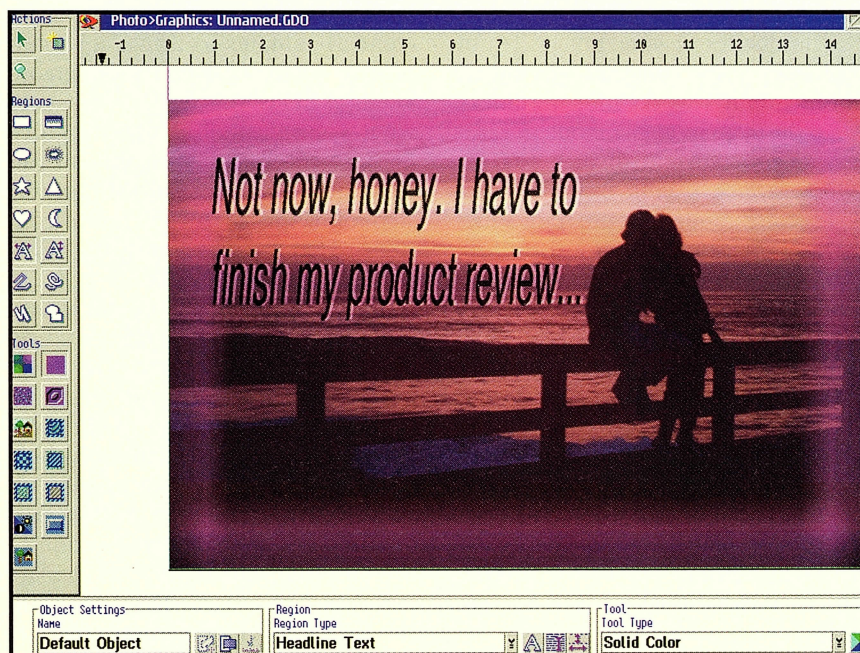


Figure 1: PhotoGraphics' well-designed layout makes its power easy to use.

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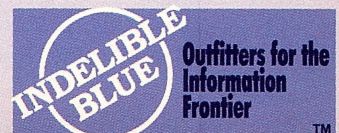
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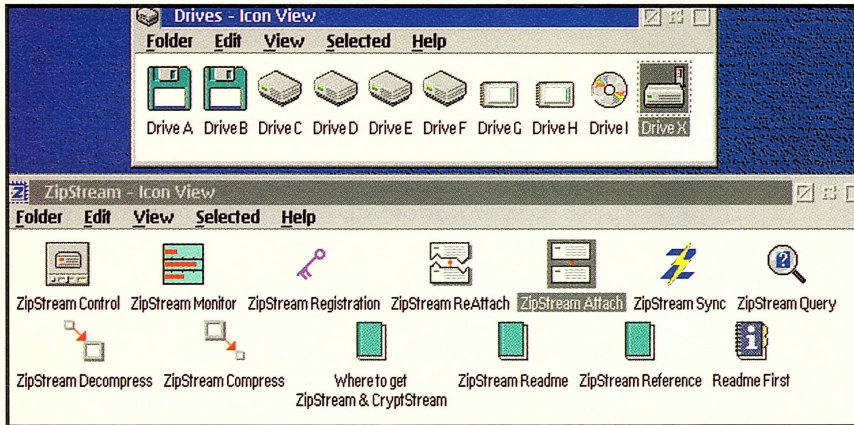


Figure 2: ZipStream drives can be accessed like normal Workplace Shell devices.

files as you migrate your applications to compressed mode. Still, that seems a small price to pay for the ability to move at your own pace and not have to commit an entire partition to compressed files.

Once the new drive letter is attached, it is available on the Workplace Shell (WPS) desktop like any other drive, which means you can use drag and drop with compressed files just like uncompressed ones (Figure 2).

ZipStream exploits OS/2's multithreading to improve performance. When data is being written, it is initially output in uncompressed form so processor time isn't required. Then, a separate thread compresses the data in the background while your application continues at normal speed. (Unfortunately, that action disqualifies ZipStream for use with Write Once Read Many drives.) Overall performance has improved quite a bit from 1.03, with the addition of new compression algorithms and tighter code for the old ones. You still have the option of specifying the compression algorithm you want to use, and three new levels from which to make that choice are available.

Version 1.20 fixes some problems that occurred in earlier versions when working with ZIP or Magneto Optical drives. Numerous utilities are included; notably, a monitor with the result of ZipStream's efforts showing the compression ratio achieved and the amount of space saved. Carbon Based Software indicates that you can expect 50 to 90% compression based on file type. I never reached the 90% figure in testing, although I came close.

Glee or flee

There is still no substitute for huge disk drives. They provide a higher level of integrity for your data than any compression scheme can offer. However, ZipStream is the safest compression program available for OS/2, due to its use of native OS/2 file access techniques. If you don't have to compress, I suggest you don't. But, if you must, ZipStream provides a great balance between safety, speed, and compression ratio.

But wait, there are even more data storage options available:

CryptStream 1.20

As you store more and more information on your system, chances are good that some of it will be sensitive data. Whether you're trying to secure new product plans from competitors' eyes or love letters to your spouse from your boss's eyes, there are probably some files that you want to be sure nobody else can view. With its ZipStream experience, Carbon Based Software was in an excellent position to provide this type of security.

Built on an installable file system

CryptStream is built on the proven file system that forms the basis of ZipStream. As such, activation of its function is done by attaching an existing partition as a CryptStream drive. Once the attachment takes place, data accessed via the new drive letter is automatically encrypted and decrypted transparently to the user

and his or her programs. CryptStream can, therefore, be used with files on FAT or HPFS partitions and on disks and network drives just as easily as your local hard disk. Encryption can be done for just one or two files, instead of an entire partition. CryptStream also gets the performance benefits of the background write routines and file-caching algorithms that have been developed and improved for ZipStream. Of course, that file system base also means that you can't encrypt your OS/2 device drivers, but then, it's hard to imagine them posing a significant security risk.

Flexible DES encryption

Based on the Data Encryption Standard (DES), CryptStream can utilize the ECB, CBC, Triple ECB, or Triple CBC modes of that standard. Until you logon to CryptStream, encrypted drive letters cannot be accessed. Once you've logged on, though, access proceeds normally, without requiring any user action. The encryption key isn't stored on the system, so someone stealing your computer cannot determine the access code. Instead, it is generated based on the registration key plus the password you enter during logon. Passwords can be up to 32 characters long and can include spaces and special characters.

If you're going to be away from your system, a logoff facility secures encrypted drives. For additional security, when files accessed by an encrypted drive letter are deleted, the disk space is physically overwritten.

The DES algorithms are quite complex, as you would expect if they are to be effectively unbreakable. As a result, however, performance suffers a bit when accessing encrypted data. The delay isn't a problem in most situations, but it could be enough to cause problems if you encrypt high-volume files on a server.

Glee or flee

Because much of the function of CryptStream was described earlier in the ZipStream review, I only need to add that CryptStream does a great job of providing tight security for your data with very little effort on your part. If you need to secure any of your files, it's hard to imagine a less

Test Drives

painful technique that would still provide adequate safety.

But suppose you need both security and compression?

ZipStream Secure 1.20

It was an easy and natural step for Carbon Based Software to provide a product that allows you to both compress and encrypt your data. ZipStream Secure offers all of the options and add-on utilities of its component applications.

The ZipStream Secure commands look almost exactly like the ZipStream commands, with an additional option. If you include the `-e` parameter to a `zsattach` command, the data on the new drive letter is considered an encrypted drive. You must logon to ZipStream Secure (with the appropriate password) before you can access that letter. Likewise, if you include the `-e` parameter to the `zspack` command, files aren't just compressed, they're also encrypted.

Glee or flee

Clearly, if you need both encryption and compression, this is the least painful way to accomplish it. Now that the company has a proven file system engine, and the work has been done to make that engine accessible to multiple front-ends, I expect we will see even more file control utilities from Carbon Based Software.

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Brian Proffit left IBM's OS/2 team to become director of PC Week's Corporate Labs. Now president of Visionary Research, senior contributing editor for OS/2 Magazine, and solutions advisor to PC Magazine, he can be reached at 75300.1466@compuserve.com.

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2. **Get Rid of Garden Pests:** Put ladybugs or praying mantis in your garden instead of using insecticides. Contact your local nursery for alternative ideas to herbicides and pesticides.
3. **Fix Your Car Leaks:** Recycle your motor oil at your local mechanic or garage. Don't dump it into a storm drain. More oil enters beaches and lakes from urban runoff than from tanker spills.
4. **Use Non-Toxics:** Buy earth-friendly products now. Vinegar and baking soda are excellent cleaning agents.

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REXX on OS/2 Warp 4.0

BY DICK GORAN

If my e-mail is any indication, there's a great deal of confusion about REXX on OS/2 Warp 4.0, which was released by IBM on September 25, 1996. Last month, I described the presence of the traditional or "classic" REXX interpreter along with the new Object REXX interpreter. This release is the first official release of Object REXX. All prior releases were betas that were only available to subscribers to the IBM Developer Connection CD-ROM. In September 1995, I described all of the new functions that were supposed to be included in REXXUTIL. Well, there's good and bad news. The 38 new functions shown in Table 1 are included in REXXUTIL, but only for the version that's used with Object REXX. The version of REXXUTIL that is installed by default with classic REXX when you install OS/2 Warp 4.0 does not contain any of these new functions.

True to form, IBM did not do a very good job of documenting many of the new functions and did not document some of the functions at all. Error-indicating return codes are the primary weakness of the functions that were included in the *rexx.inf* documentation. The *rexx.inf* for both classic REXX and Object REXX make reference to return codes passed back by the underlying Application Programming Interface (API) calls. Unfortunately, these return codes are only available from IBM in OS/2 developer documentation. The other source for this documentation for REXX programmers is in the *REXX Reference Summary Handbook*. Because 38 functions are included in the Object REXX version of REXXUTIL that do not ap-

pear in its classic REXX counterpart, lack of space prohibits me from including them all here. Table 2 contains four functions from the *Handbook* that are not documented in the *rexx.inf* file that accompanies Object REXX on Warp 4.0.

The new functions fall into one of the following groups: Event/Mutual Exclusion (mutex) Semaphores, File System functions, Function Library routines, Macrospace functions, and National Language functions.

File System functions

The **SysAddFileHandle()** and **SysSetFileHandle()** functions were implemented to overcome a "fix" made to OS/2 Warp. Because OS/2 Warp reduced the default number of file handles per session to 20 (with only 15 of the 20 being available to a user program), these functions were added to allow the number of file handles to be adjusted for the current session. **SysBootDrive()** returns the uppercase letter of the boot drive followed by a colon. **SysFileSystemType()** returns the name of the file system used on the specified drive. It will return FAT, HPFS, CDFS, or LAN for valid drive designations; otherwise, it returns a null string. **SysQueryEAList()** allows you to retrieve a list of all of the Extended Attributes (EA) associated with a file or directory. You can then retrieve the specific EA data using the pre-existing **SysGetEA()** function. The list of EA names is placed in a compound variable. **SysWildcard()** returns the result from editing a source file name with a wild card mask. The editing is done using **DosEditName()**.

Semaphore functions

Semaphores signal the beginning and end of an operation and provide mutually exclusive ownership of resources. Typically, semaphores are used to prevent more than one processor thread within a process from accessing a resource. Semaphore names are validated by the file system and must include the prefix **\SEM32**. Semaphores are divided into three types, according to the functionality they provide:

- Event semaphores enable a thread to notify waiting threads that an event has occurred.
- Mutual exclusion (mutex) semaphores enable threads to serialize their access to shared resources.
- Multiple Wait (muxwait) semaphores enable threads to wait either for multiple events to occur, or for multiple resources to become available.

The new mutex and event semaphores share the **SysCreate...()**, **SysOpen...()**, and **SysClose...()** function calls. Mutex handling is also permitted with **SysReleaseMutexSem()** and **SysRequestMutexSem()** where as the additional event semaphore functions include **SysPostEventSem()**, **SysResetEventSem()**, and **SysWaitEventSem()**.

Process Control functions

This group of functions includes the oft-requested ability to shut down the OS/2 system from a REXX program. That task can now be accomplished with the **SysShutDownSystem()** func-

tion. Session priority can be changed with **SysSetPriority**(*class, delta*) where *class* indicates the new process priority class with the allowed classes being:

- 0 No change, leave as is
- 1 Idle time priority
- 2 Regular priority
- 3 Time critical priority
- 4 Foreground server priority

Delta is the change applied to the process's priority level. The delta value must be in the range -31 to +31. **SysProcessType**() returns one of the following values, indicating the type of process in which the REXX program is running:

- 0 Full screen protect mode session
- 1 Requires real mode
- 2 VIO windowable protect mode session
- 3 Presentation Manager protect mode session
- 4 Detached protect mode process

SysQuerySwitchList(*name*) and **SysSwitchSession**(*name*) permit the system switch list to be interrogated and the focus to be changed to the named session, respectively.

SysElapsedTime(*option*) minimally uses the first letter of the following strings: *Elapsed*—returns the number of seconds and microseconds since the elapsed time clock was started or reset. This is the default. *Reset*—returns the number of seconds and microseconds since the elapsed time clock was started or reset and also simultaneously resets the elapsed time clock to zero. The value returned will be in the same format as the built-in **TIME**('E') function—'ssssssss.uuuuuu', for example. The number will have no leading zeros or blanks. The fractional part will always have six digits.

National Language functions

The National Language functions control the OS/2 code page settings and perform national language-sensitive

operations such as uppercasing and comparisons. The functions include: **SysGetCollate**(), **SysMapCase**(), **Sys-**

NationalLanguageCompare(), **SysQueryProcessCodePage**(), and **SysSetProcessCodePage**().

Table 1: New REXXUTIL functions for Object REXX.

Event Semaphore functions

SysCloseEventSem()
SysCreateEventSem()
SysOpenEventSem()
SysPostEventSem()
SysResetEventSem()
SysWaitEventSem()

File System functions

SysAddFileHandle()
SysBootDrive()
SysFileSystemType()
SysQueryEAList()
SysSetFileHandle()
SysWildcard()

Macrospace functions

SysAddRexxMacro()
SysClearRexxMacroSpace()
SysDropRexxMacro()
SysLoadRexxMacroSpace()
SysQueryRexxMacro()
SysReorderRexxMacro()
SysSaveRexxMacroSpace()

Mutex Semaphore functions

SysCloseMutexSem()
SysCreateMutexSem()
SysOpenMutexSem()
SysReleaseMutexSem()
SysRequestMutexSem()

National Language functions

SysGetCollate()
SysMapCase()
SysNationalLanguageCompare()
SysQueryProcessCodePage()
SysSetProcessCodePage()

Process Control functions

SysElapsedTime()
SysProcessType()
SysQuerySwitchList()
SysSetPriority()
SysShutDownSystem()
SysSwitchSession()
SysWaitForShell()

Function Library routines

SysDropLibrary()
SysLoadLibrary()

Table 2: Undocumented REXXUTIL functions.

SysDropLibrary(DLL[, drop_routine])

Returns 0 after successfully calling the *drop_routine* in DLL to terminate and deregister all of the functions in DLL; otherwise, returns 1. If *drop_routine* is not specified, **SysDropLibrary**() will call ordinal routine #2 in the DLL.

SysLoadLibrary(DLL[, load_routine])

Returns 0 if *load_routine* was successful; otherwise, 1. DLL is the name of the library module. *Load_routine* is the name of the function loader routine in the DLL. If *load_routine* is not specified, **SysLoadLibrary**() will call ordinal routine #1 in the DLL.

SysQuerySwitchList(stem)

Returns 0 after sequentially assigning the contents of the Switch List to *stem*. *Stem.0* will contain the number of entries in the Switch List.

SysSwitchSession(session_name)

Returns 0 after attempting to switch the focus to *session_name*; otherwise, returns a nonzero value. *Session_name* must contain the session name as it appears in the Window List and can be retrieved with the **SysQuerySwitchList**() function.

Note: If session_name contains a nonswitchable session, focus maybe switched to the Window List.

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The REXX Column

MacroSpace functions

The macroSpace can improve the performance of REXX procedures by maintaining REXX procedure images in memory for immediate load and execution, which is useful for frequently used procedures and functions, such as editor macros. Programs loaded and registered in the REXX macroSpace are available to all processes. They can be called as functions or subroutines from other REXX programs just as other REXX external functions are called. However, the macroSpace REXX procedures can be placed at the front or at the end of the external function search order **SysAddRexxMacro(name, file, [order])**. REXX procedures in the macroSpace can be saved to a disk file **SysSaveRexxMacroSpace(file)**. A saved macroSpace file can be reloaded with the **SysLoadRexxMacroSpace(file)** function. An application, such as an editor, can create a library of frequently used functions and load the library into the macroSpace for fast access. Multiple macroSpace libraries can be created and loaded. The other macroSpace functions include: **SysClearRexxMacroSpace()**, **SysDropRexxMacro()**, **SysQueryRexxMacro()**, and **SysReorderRexxMacro()**.

The REXX macroSpace is placed in shared memory. The size of the macroSpace is only limited by the amount of memory and swap space available to the system. However, as the macroSpace grows, it limits the memory available to other processes in the system. Allowing the macroSpace to grow too large might degrade overall system performance due to increased system swap file access.

Function Library routines

The Function Library routines include **SysLoadLibrary()** and **SysDropLibrary()** and are intended as an assist in the loading and dropping of REXX external function libraries. They have extended flexibility over the built-in functions **RxFuncAdd()** and **RxFuncDrop()** because they include the ability to reference ordinal routines within a .dll. If a load routine is not specified, **SysLoadLibrary()** will call ordinal routine #1 in the DLL. Similarly, if the name of the routine to be dropped is not specified, **SysDropLi-**

brary() will call ordinal routine #2 in the DLL.

URLs from the command line

A bug with classic REXX that prevents you from passing a parameter that contains two or more concatenated slashes to a REXX program has been repeatedly reported to IBM since OS/2 2.1. With OS/2 2.1, this problem affected a very small audience. However, with OS/2 Warp 3.0 and the increased awareness and use of Internet URLs, this bug became more than a minor annoyance. Two common Internet protocols, **http://** and **file://**, cannot be passed to a classic REXX program. IBM fixed the problem in Object REXX but has ignored it in classic REXX. The problem stems from the way you indicate to the REXX interpreter in classic REXX that it is only to tokenize the code in a program when the command line parameter of **//t** is specified and not to execute the program. The **//t** option still functions for Object REXX, but other command line parameters containing a double slash are passed to the program. Bernd Schemmer's *REXX Tips & Tricks* includes a workaround for classic REXX. **OS/2**

Dick Goran is the author of The REXX Reference Summary Handbook, an OS/2 reference. His free REXX utility programs can be downloaded from OS2DF1, Lib 6 on CompuServe or FTPed from <ftp://ftp.cfsrex.com/pub>. He can be reached via e-mail at 71154.2002@compuserve.com.

Resources:

REXX Reference Summary Handbook, 4th ed. (\$27.95, ISBN 0-9639854-3-4)

CFS Nevada Inc.
 (800) 739-9672
 WWW <http://www.cfsrex.com/>
 READER SERVICE NO. 111

REXX Tips & Tricks (free for download)

FTP <ftp://ftp.cfsrex.com/pub/ixtt22.exe>
 (self-expanding ZIP file)

It was time to reopen the backup issue. Hard-drive prices were dropping drastically while we were spending too many hours waiting and swapping tapes in and out of our CMS Jumbo 250 drive, when we realized that our backup system seriously needed upgrading. We were still using 250MB (compressed) tapes to back up about 5GB of storage distributed over two workstations and a Novell NetWare file server.

Thus began our total examination of OS/2 backup options, both hardware and software. We wanted hardware that could handle more than the theoretical 250MB per tape of our CMS Jumbo drive and software that understood our network—so one backup device could back up all the OS/2 peer workstations and, hopefully, the NetWare server.

Naturally, we wanted the most cost-effective solution, both in terms of initial expense and running costs. It would ideally back up all of our drives to the minimum number of storage containers, be they tapes or removable disks. However, two other items beyond cost were imperative:

- Speed and the ability to schedule unattended backups was necessary. While purchasing an automatic tape changer or autoloader wasn't in our immediate plans, it was a future consideration.
- Disaster recovery was also essential. With OS/2, getting the system back after a major crash is not simply a matter of reinstalling OS/2. Putting things right requires restoring the lost *config.sys* and various *.ini* files. Good backup software makes it easier than starting at square one by reinstalling OS/2 from a CD-ROM or floppies.

When it comes to tape, capacity and costs are easily computed. Capabilities, with respect to the network and hardware/software combinations and features, could be determined by reading manuals and boxes. Evaluating performance, however, required getting our hands "dirty" with some practical testing.

Getting to work

Because we were reluctant to part with our old workhorse, a CMS Jumbo

250 attached to the floppy controller we began the project right there. For updated hardware, we added the Iomega Ditto 3200 tape unit, as well as a Syquest 230MB EZFlyer, a removable hard-drive package. Both connected to the parallel port. Then, we tossed in Travan 4 and 4mm DAT drives from APS Technologies, both running off an Adaptec SCSI 1542 controller. Finally, we rounded out the mix with IBM's DualStor 800, a hardware/software combination that comes with a tape drive that uses Travan 1 cartridges and hooks up to the floppy controller the same way as the Jumbo.

This selection was limited; we didn't include devices such as the Colorado Trakker series. But, combined with the list of supported devices that came with the software, they would be enough to guide us in making a final choice.

On the software side, we rounded up six packages, including DualStor, which comes with the IBM drive previously mentioned. The other packages were Cheyenne's ArcSolo, BackAgain/2 from Computer Data Strategies,

MSR Development's BackMaster, PCX's BackupWiz, and Sytos Premium (offered by Seagate Technologies.)

In theory, trying all the combinations would have resulted in a total of 36 tests. Mercifully, not all software supported all the hardware options at our disposal. Table 1 indicates those combinations that were not supported with an "n/s" (not supported).

The software

ArcSolo 1.7

ArcSolo supports QIC tape drives that are attached to the floppy controller or other high-speed controllers, as well as a wide range of SCSI

Table 1: A comparison of backup times with various drive/software combinations.

	CMS Jumbo	DualStor 800	Iomega Ditto	Syquest EZ Drive	SCSI TR4	SCSI DAT
<i>ArcSolo Backup</i>	10:13	10:13	n/s	n/s	2:31	1:47
Total time	21:16	21:27	n/s	n/s	**	**
<i>BackMaster</i>	13:40	n/s	10:39	n/s	n/s	n/s
Total time	30:22	n/s	24:10	n/s		
<i>BackAgain/2</i>	n/s	n/s	n/s	4:24/4:26*	3:10	2:32
Total time	n/s	n/s	n/s	10:18/4:26*	**	**
<i>BackupWiz</i>	n/s	n/s	n/s	4:05	n/s	n/s
Total time	n/s	n/s	n/s	***		
<i>DualStor</i>	14:10	21:28	n/s	n/s	n/s	n/s
Total time	26:40	34:53	n/s	n/s	n/s	n/s
<i>Sytos Premium</i>	13:40	n/s	n/s	n/s	n/s	n/s
Total time	28:17	n/s	n/s	n/s		

n/s: not supported.

*Verified during backup. **Verification performed by hardware during backup.

***During verification program asked for nonexistent second cartridge to be inserted.

How We Tested

All the tests were performed on a 66MHz 486DX2-based clone with 16MB RAM running OS/2 Warp Connect. The hard-drive controller was a Promise EIDE card with a 2GB Seagate hard drive.

We created a directory on an HPFS volume on this drive and loaded it with a mix of 121 program and data files totaling 50MB.

Although all of these software packages do offer data compression, we turned it off in every case except in ArcSolo, which did not offer that option. We used automatic verification to compare the backup with the original files, since the only thing more useless than no backup is a backup that won't restore.

Thanks to OS/2's multitasking, most of these packages allowed backup to take place in the background, but we did not do so in order to avoid skewing the results; thus, these should be the best times for the hardware/software combinations.

Each software package was tested with whatever hardware it supported. As we juggled these setups, we were careful to avoid potential driver conflicts by installing each on a "clean" system.

Rather than rely on the time figures provided by the software packages, we used our own trustworthy stopwatch. We clocked the backup itself and a total time, which included the verification or comparison, as well as the time it took to write directory information, reset the tape, and so on. These times should be used only as a rough guideline in making your choice. Your mileage may vary depending on your particular setup. We did not time backups over the network, because we felt those backups would be primarily a measure of network speed.

tape drives. It backs up LAN Server networks, but not NetWare.

ArcSolo's interface is unlike the others. Launching a backup opens two windows—one for the source, the other for the destination, where the hard disks and tape drives reside, respectively. Selecting a source and dragging it to the tape drive icon begins the backup. For users who like drag and drop, it's very comfortable.

Scripts created using a Script template ease both Backup and Restore processes. You can configure filters to select files for backup, as well as set times, days of the week, and dates for scheduled backups.

We had a few problems with some aspects of the software. ArcSolo puts the ArcSolo Controller in your Start-up folder, where it gets launched on boot. Without it, nothing can be done. When we had to cancel a backup, the Controller program refused to back off and release the tape drive. Freeing it up required closing and restarting the Controller.

On the plus side, ArcSolo supported our late model SCSI drives, and it was undeniably quick. It surprised us by showing a significant speed advantage with the CMS Jumbo 250 and

the DualStor unit, in addition to the SCSI units. This factor is probably a result of the data compression used, which could not be disabled.

ArcSolo's latest version offers the most extensive disaster recovery of all the packages, even allowing the user to repartition the drives from the recovery disks. These three user-created disks reinstall the operating system, the tape software, and all the relevant files needed to restore the status quo.

However, ArcSolo's documentation badly needs updating. The main manual gives the impression that there is no disaster recovery. Instead, the procedure is described in an addendum, which we overlooked on our first encounter with the software.

Another minor drawback is the lack of a status indicator during verification of a backup, something the other packages do offer.

BackAgain/2 Professional 4.0c

BackAgain/2 positions itself as an industrial strength program. For example, it does not support floppy-based tape drives, like the CMS Jumbo. However, it does support backing up to a wide variety of SCSI and the newer EIDE tape devices, autoloaders,

floppy disks, and any removable media drives to which OS/2 can assign a drive letter, such as our Syquest EZFlyer 230. For disk backup, it even offers its own formatting option, creating a format that is supposedly faster than the standard OS/2 format.

Installation and configuration was problem free. In operation, the program was Workplace Shell (WPS) friendly, supporting drag and drop with easy to use drop-down menus, pick lists, and dialog boxes.

BackAgain/2 also offers flexibility in choosing which files to back up. Lists of files to be backed up are created by defining patterns based on the names (all .txt files, for example) or on the "created before" or "after" date and time. Excluding or including files from a list is a simple point-and-click operation. Several levels of compression are available. Having a range to choose from allows you to save either space or time.

BackAgain/2 also offers the unusual option of verifying the backup either during or after the process. The manual notes that verifying during backup increases the operation's time by about 40%, as opposed to verification after the backup is finished, which just about doubles it. Because many SCSI tape devices do their own verifying, verification can be turned off to save time.

Disaster recovery is a one-step process using updated OS/2 Utility disks. BackAgain/2 supports OS/2 Peer, LAN Server, and NetWare networks.

On the negative side—and these are minor points—the documentation is thin, and the manual lacks an index. The online help is all the more needed and, fortunately, it is good.

BackMaster 2.0

BackMaster 2.0 is the software that Iomega offers as an OS/2 backup solution for its Ditto 3200 tape drive. In addition to the Ditto, BackMaster supports floppy-based systems such as the CMS Jumbo line, SCSI tape and SCSI DAT, and a variety of parallel port-based systems, including the Colorado Trakker, Iomega Ditto, and MicroSolutions BackPack. It doesn't support the Syquest EZFlyer or backup to network or shared drives, however.

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Installation was straightforward, requiring selection of the driver to be installed (from an extensive pick list). BackMaster also offers installation of a memory enhancement feature for systems with only 8MB RAM installed.

You configure BackMaster using a Settings notebook. Pages include items such as Backup (autoverify on or off, compression on or off), Restore (overwrite options), and settings for tweaking the drivers for the various backup devices. These latter settings were extremely useful, because adjusting timing and transfer speeds for the different choices can affect performance and can even determine whether a device will work at all. In the case of the Iomega Ditto drive, a change in control and data delay settings was required to get it up. Similarly, nonstandard DMA, IRQ, and address settings for a floppy setup can be handled here, as well as data transfer speeds.

Running the Backup and Restore functions was easy. Once a backup configuration has been set, it can be saved as a File Selection Set (.fss) file to be retrieved for use at any time in the future.

BackMaster's scheduling function is relatively unsophisticated. A page in the Settings notebook provides a place to schedule future operations by date and time. However, setting up a repeated schedule (the first day of every month at 10:00 a.m., for example) isn't supported, meaning that every time you want to run an unattended backup, you have to set it, instead of setting it once and forgetting it.

Disaster recovery uses recovery floppy disks to restore your system. BackMaster supports LAN Server, LANtastic, and OS/2 peer networks but does not support Novell NetWare networks' special files.

BakupWiz 1.13s5

BakupWiz is listed on the box as a SCSI backup solution. It does not support floppy-drive-based systems such as the Jumbo 250 or the DualStor unit. It does support parallel port-based, removable media hardware such as the Syquest EZFlyer 230, which comes with an OS/2 driver and becomes a recognized drive on the

system. This does not, however, apply to a tape drive such as the Iomega Ditto 3200.

Installation was simple enough. While running, BakupWiz has a character-based interface, which we found felt antediluvian (although this is a matter of personal taste).

Configuring BakupWiz requires more effort than a floppy-drive system such as DualStor. There is no Plug 'n Play here; at the very least, the SCSI device number has to be entered in a lengthy configuration screen. We were unable to get it to recognize our SCSI units.

Setting up a backup was also less convenient than with our other packages. BakupWiz did not offer the tree-views or pick lists from which file selections could easily be made. To set up our selective backup, full paths and files had to be entered on an Include Files screen, while a second screen offered a chance to exclude other files in the same way. Only after the choices were made did BakupWiz scan the system to build the list of files to be backed up.

The only way to schedule a backup is by running BakupWiz from the command line and applying a command line switch (-Shh:mm), which is both inconvenient and inflexible. Presumably, a REXX program could be written to provide greater functionality, but that seems a troublesome solution.

Nor does BakupWiz offer the crash recovery that the other packages provide. Instead, the user must first reinstall OS/2, then BakupWiz, and then do the Restore from the backup tape. BakupWiz does support backup of both NetWare- and NetBIOS-based networks (OS/2 Peer and LAN Server).

Overall, BakupWiz is hampered by its interface. It also lacks the bells and whistles found on other packages, such as recurring scheduled backups and crash recovery.

DualStor 3.0

While it may not have the prettiest interface, IBM's DualStor software is inexpensive and one of the easiest to install and use. The graphical interface is clear and helpful, using separate windows to show information on

the tape drive, disk drives, server connections, and list of logs of previous sessions.

We found it quick and intuitive. Double-clicking on a disk drive icon opened a window showing a drive directory tree, so individual folders/files could be marked for backup using the pop-up menu. It made creating a customized backup job extremely easy, and a Save option made it a simple matter to retain those settings for future use.

DualStor offers degrees of data compression that can affect both tape used and time. Using a directory of typical data files, primarily text with some uncompressed TIFF images, Level 1, 3.5MB compressed at a ratio of 2.2 to 1. At Level 2, the compression ratio rose to 2.7 to 1, but backup time was slightly longer.

The value of data compression depends on the data being backed up. Files such as .zip, .gif, .avi, or .jpg don't benefit as they are already compressed. Data compression offers significant space savings with normal text and data files, usually without imposing a penalty on the speed of the backup—particularly on fast machines.

DualStor offers excellent disaster recovery, which IBM calls Stand-Alone Restore (SR). The first time we used DualStor with the CMS Jumbo, it failed, issuing a DMA Overrun error. A phone call to IBM's tech support merely got us a "we only support our own hardware" response. The second time we installed the software, the problem disappeared. The *read.me* file offered some parameters to add to the device driver line in *config.sys* to correct this problem, as well as some speed problems associated with different floppy controllers.

If you're considering DualStor and don't already own something like the CMS Jumbo, it would be wise to consider picking up the entire software/hardware combination offered by IBM. The DualStor 800 tape drive that we tested used Travan 1 tapes, which hold 800MB of compressed data.

DualStor uses a program called AutoTape to handle scheduling for unattended backups. It allows multiple events to be scheduled on a

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curing basis daily, weekly, on week-days only, or monthly. By putting a shadow of AutoTape in the Startup folder, the installation program makes sure it's available and running if you want it.

DualStor supports LAN Server, OS/2 peer, LANtastic and NetWare networks.

Syτος Premium 2.1

Before this project, we'd been running Syτος Premium as our backup software with the CMS Jumbo, so we went into this review with greater familiarity with its operation.

Syτος Premium is the only package that came on three floppy disks. Much of that space is devoted to drivers for backup hardware. Installation went smoothly and easily.

While Syτος Premium can read QIC 80 tapes, it uses its own format for writing data. Therefore, if you decide to change to a different software in the future, your Syτος backups may be unusable.

As attractive as it is, Syτος' interface is not that intuitive. Creating a custom job and saving it requires more fumbling than DualStor does, for example.

Part of the reason for this complexity is Syτος' flexibility and power. It supports multiple backup devices and includes or excludes files based on rules, such as date ranges or extension. Restoration is just as flexible, permitting establishment of rules for redirecting files based on date or extension to different directories.

In addition to floppy-connected devices, Syτος supports SCSI, cascaded, and autoloader devices. It presently does not offer a driver for the Iomega Ditto 3200. Nor does it support removable devices such as the Syquest EZFlyer 230 or have drives available for our Travan 4 or DAT units. According to Seagate, new software is expected later this year that will support the EZFlyer and perhaps the new Travan 4 devices, including ATAPI/IDE drives.

The types of backups supported include Full, Incremental (backup of files changed since the last Full or Incremental backup), Differential (backup of files changed since the last Full

Table 2: Comparison of media costs for the various backup devices.

Medium	Capacity (MB)*	Price (ea)	Cost per megabyte
CMS Jumbo 250	120	\$13	\$0.1083
Travan TR-1	400	\$27	\$0.0675
Travan TR-3	1,600	\$35	\$0.0219
Travan TR-4	2,000	\$39	\$0.0195
4mm DAT	4,000	\$24	\$0.0060
Syquest EZFlyer 230	230	\$30	\$0.1304
*Uncompressed			

backup), and Copy. Syτος Premium also has a "groom" feature, which allows you to back up files of your choice and then automatically deletes them from your hard drive.

One minor drawback that's worth mentioning is that the Rebound disaster recovery feature does not work if the tape device shares the floppy controller. Otherwise, with Rebound working, it is simply a matter of grabbing the disks you create after Syτος' installation. Doing it without Rebound requires installing OS/2 and Syτος Premium, followed by some redirection and renaming of the *os2.ini* and *os2sys.ini* files during restoration to get things back the way they were.

Syτος Premium's scheduling of unattended operations is excellent. It can set them up to take place daily, weekly, or monthly on a set day. They can be Full, Incremental, Differential, or a simple Copy. Multiple operations can be created, so that an incremental backup of changed files will be made every day at the same time to one device, while a full backup will be made to another on Sunday, for example, or different drives can be backed up on different days or at different times.

The network support is good. It supports OS/2 Peer and LANtastic, as well as LAN Server. However, it cannot back up LAN Manager or UNIX servers.

The hardware

As Table 1 shows, the speed of a backup is primarily determined by the hardware. Both the CMS Jumbo 250 and the IBM DualStor 800 drive

speeds were determined by the capabilities of the floppy controller. Data transfer rates tended to run between 3.5MB/min and 4MB/min. Oddly, the DualStor software was slightly slower using the DualStor drive than with the Jumbo 250.

The Syquest EZFlyer 230 attached to the parallel port and performed well. BackupWiz and BackAgain/2 shoveled 50MB onto the removable hard disk in less than 5 minutes, about one-third the time of the floppy-based backups. The disk has a capacity of 230MB and, in theory, up to 460MB if data compression is enabled.

The Iomega Ditto 3200 also attached via the parallel port, but the only software that supported it was BackMaster. It was somewhat faster than the floppy-based systems, slower than the Syquest. The Ditto uses Travan 3 tapes with a claimed 1.6GB capacity uncompressed, or 3.2GB at a 2 to 1 compression ratio.

Nothing could hold a candle to the two SCSI units we tested. Both the Travan 4-based APS HyperTape and the 4mm DAT unit blew the doors off even the Syquest, with the DAT slightly faster.

Worth the cost

While a good backup may be priceless, the cost of what it's stored on is a factor. As Table 2 indicates, even the most expensive tape option, the Jumbo 250's DC2120, costs less than the Syquest cartridge. As your storage needs grow, the cost difference becomes even more significant.

Obviously, you don't want more

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capacity than you need—a 4GB tape to back up an 810MB hard disk makes little sense. However, if you have less capacity than you need, the result can be tape swapping and having to keep track of multiple tape volumes.

But even with the cost issue aside, backup software and hardware is far too often an afterthought. The first time you hit the Delete command at the wrong time, you have a disk crash, or a virus strikes, you'll regret not putting it near the top of the shopping list. It doesn't pay to skip or skimp on backup hardware and software. If that means knocking a few hundred megabytes off the hard drive you want, so be it.

Buy hardware with the capacity and speed to handle your complete system conveniently. Pick software that you are comfortable with—one that easily sets up the types of automatic backups you need. The backup that isn't created because "it's too much trouble" or "we didn't have the time" is no backup at all.

For small, simple systems, we recommend IBM's DualStor purchased as a unit. The software is easy to set up and use, and the speed and the capacity of the DualStor drive is perfectly suitable for relatively small and incremental backups.

For larger systems, our preference is BackAgain/2 Professional. It supports a variety of backup devices and combines speed and power with a good, manageable interface. Scheduling unattended backups is both flexible, powerful, and relatively easily done.

Sytos Premium runs second only because its interface is awkward and it lacks support for the Ditto and similar drives. BackMaster's support of the Iomega Ditto makes it the only choice for that drive. The only real drawback to BackMaster is the limited scheduling ability for unattended backups. ArcSolo runs a dead heat with Sytos Premium, suffering mainly from an unfamiliar default interface, apparent limited configurability, and needing improved documentation. BackupWiz's interface and poor scheduling abilities turned us off.

As Table 2 illustrates, drives such as the Syquest EZFlyer or the Iomega Zip do not make sense for most back-

up use. A 4GB backup could require about \$240 worth of Syquest disks, at about \$30 each, compared to a single 4GB 4mm DAT tape (uncompressed) for about \$24, or even one Travan TR-4 tape for about \$39. When you consider that any secure backup program requires rotating the backup media, the expense becomes prohibitive.

Where the Syquest media do come into play is for archiving occasionally used software or data and for moving large amounts of data from an office computer to home and back. If you already need Syquest for that, using it for incremental backups as well makes sense.

For hardware, if you can't afford a SCSI DAT solution, consider one of

the new EIDE Travan drives that are nearly as quick. For lightweight use, the QIC drives, with either floppy or high-speed controller attached, are certainly acceptable as long as adequate capacity is purchased.

If you need to back up multiple systems that are not networked, the Iomega Ditto parallel port unit is the obvious choice. OS/2

Dennis Fowler is a contributing editor with Computer Shopper magazine where his monthly column, "Treading the Boards," can be found. Dennis can be reached at dfowler@norwich.net.

Resources:

Adaptec 1542CP SCSI card (\$249)

Adaptec Inc.
(408) 945-8600
Fax (408) 262-2533
READER SERVICE NO. 114

APS HQIC SCSI TR4 tape drive (External, \$499) APS HDAT PRO 4mm DAT tape drive (External, \$999)

APS Technologies Inc.
(816) 483-1600
READER SERVICE NO. 115

ArcSolo 1.7 (\$295)

Cheyenne Software Inc.
(800) 243-9462
Fax (516) 484-2489
READER SERVICE NO. 116

BackAgain/2 Professional 4.0c (\$139)

Computer Data Strategies
(612) 730-4156
Fax (612) 730-4161
READER SERVICE NO. 117

BackMaster 2.0 (\$89)

MSR Development Corp.
(619) 633-3900
Fax (619) 633-3909
READER SERVICE NO. 118

BakupWiz 1.13s5 (\$149)

PCX
(619) 259-6300
Fax (619) 481-6474
READER SERVICE NO. 119

Ditto Easy 3200 (Parallel port tape drive, \$299)

Iomega Corp.
(800) 697-8833
(801) 778-1000
READER SERVICE NO. 120

DualStor (Software and tape drive, \$249; software only, \$49)

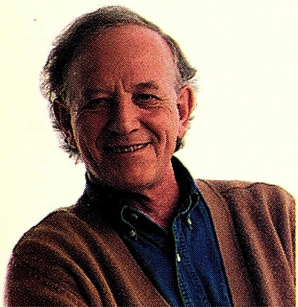
IBM Direct
(800) 426-2255
Fax (800) 242-6329

EZFlyer 230 (Parallel port drive, \$299)

Syquest
(510) 226-4000
Fax (510) 226-4108
READER SERVICE NO. 121

Sytos Premium (\$299)

Seagate Software
(407) 333-7500
Fax (407) 333-7720
READER SERVICE NO. 122



The *Levelization* of the Playing Field

BY STAN KELLY-BOOTLE

I always make a point of browsing the computer section, if there is one, of any bookstore I happen to visit. The conditional aside, in fact, is hardly needed since it's rare nowadays to find a book shop that totally ignores the computer market. Indeed, one of my favorite outlets, Computer Literacy, flourishes by totally ignoring the noncomputer market (although there are occasional lapses when books on VisualBasic are displayed). Even the supermarkets and 7 Elevens are flaunting Bill Gates' autobiography and *Internet For Dummies* alongside your Danielle Steeles and Barbara Cartlands. Now the paperback romantics are jumping on the cyber bandwagon: "Rosita glowed as the 'You have mail' message flickered in soft vermillion on her screen. Could it be the dark daemonic stranger she met at the DiskSwap?"

My browsing methodology is unabashedly author-centric, whereby the merit of the bookstore is determined by the presence or absence of books by me, my relations, friends, and enemies. (Extra marks are awarded for OS/2 titles and for any book that mentions me.) The eclecticism of the Borders chain rates highly in all these tests and earns a free plug.

For the traditional book shops and chains, allocating shelf space has always been a major problem, typically tackled by following that archetype of cunning self-fulfilling prophesies: the best-seller list. The glut of computer titles, most of which are completely inscrutable to the typical store owner, has increased the challenge, since even the best top-20 tracking systems

have trouble keeping up with our volatile industry. Small wonder that readers have complained that my recommendations can't be found. Most booksellers will "take an order"; you could also call the publisher or mail order from Computer Literacy.

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Publishers were quick to discover the perils of software versionitis and the resulting ironies of book description and blurbage. A bland "For All Versions of OS/2" is treated with justified suspicion. Customers are loath to waste their money on yet another quick update that covers their newly installed version in Chapter 23. Indeed, they may already have bought the three previous editions! On the other hand, a book boldly labeled "Warp 4.0" or "OLE 2.0" may have a short shelf life. The worst-case scenario is the book devoted to a suddenly dead project. Borland BASIC and Prolog, Taligent, and Kaleida vanished before you could say "remainder."

On the brighter side of publishing, I report a classic that will survive the vicissitudes of versions and fads: *Large-*

Scale C++ Software Design by John Lakos, Ph.D. (Addison-Wesley Professional Computing Series, Reading, Mass., 1996, ISBN 0-201-63362-0). In spite of the Eiffel challenge and all the Smalltalk and Java-jive, C++, recently blessed with a firm ISO/ANSI standard and template library, remains the dominant language for major, portable object-oriented applications. Of vital importance for OS/2 developers is the fact that C++ is a leading player in IBM's SOM/DSOM strategy for compound documents and distributed objects. Practical computer languages, be told by the Algol68 committee, take ages to evolve and mature, enduring the democratic agonies of standardization. There will always be "dark sides" to any language that is complex enough to handle nontrivial development challenges.

John Lakos's tour de force addresses the grail of scalability (grailability?) for extremely large C++ projects involving many thousands of classes and #include files, a hurdle that Java has yet to leap. Turns out that, quite apart from the syntactical opacities of C++, subtle design considerations, some physical, some logical, can rock the boat. The key is what Dr. Lakos calls *levelizability*. Nine techniques for achieving levelizability are covered in the 122 pages of Chapter 5. A summary: Make sure that your physical dependency graphs are acyclic. **OS/2**

Stan's latest book is *The Computer Contradiction* (MIT Press). E-mail him at skb@crl.com or see his Web page at <http://www.crl.com/~skb>.

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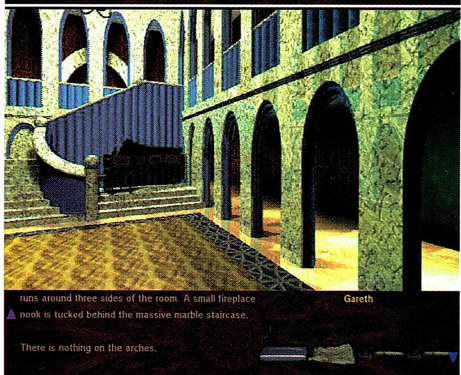
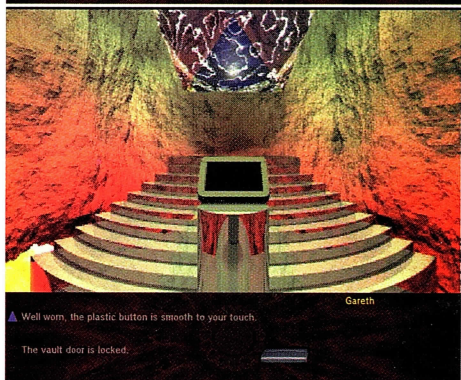
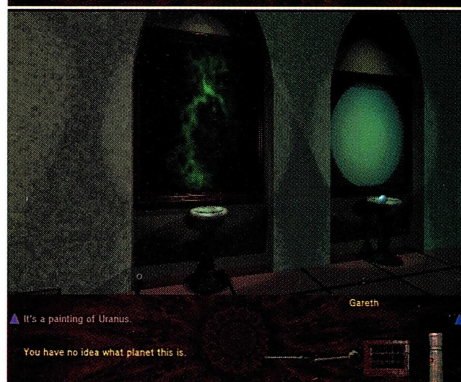
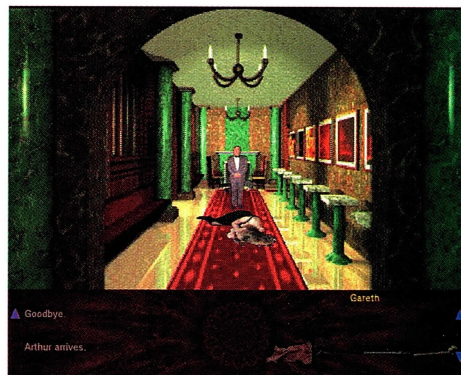
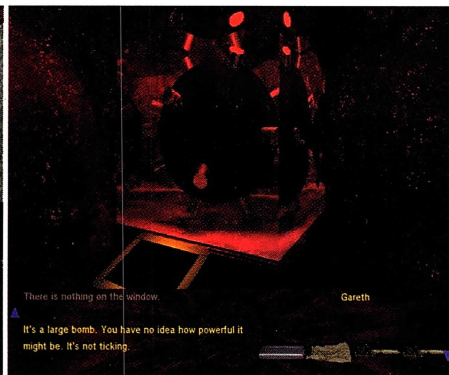
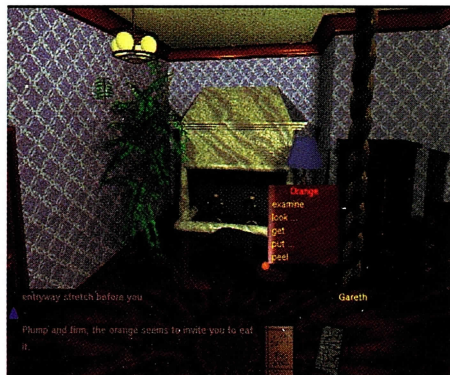
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